

Insure **VICTORY** ... — Buy Bonds for War ... — Push Plans for Peace

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Highlights Of This Issue

Equipment Care

The importance of proper equipment care and salvage has been discussed frequently in these pages, to aid highway engineers and contractors to carry on with present equipment. In this issue, a feature article tells how one of the Repair Depots of the Bureau of Yards and Docks, U. S. Navy, reconditions and restores worn construction equipment to active service. The care and operation of a county highway department's snow-removal equipment and the Division shops of a state highway department are also described.

See pages 1, 12 and 24.

Interregional Highways

The first two in a series of articles on the report of the National Interregional Highway Committee, discussing the principles which guided the Committee in its selection of the routes in the recommended system, and outlining the importance of urban traffic problems, appear in this issue.

See page 2.

Highway Maintenance

As part of its maintenance program, to conserve its highway system and save worn and damaged pavements for further service, Indiana has let a number of maintenance-construction contracts for bituminous resurfacing, one of which is described in this issue. The highway maintenance organization in North Dakota and how it is solving its wartime problems are also discussed.

See pages 7 and 56.

Surplus-Equipment Disposal

One of the most widely discussed problems facing the construction-equipment industry is the disposal of Government-owned construction equipment at the end of hostilities. Various discussions of this subject at recent association meetings, the present agencies which handle the sales of surplus equipment, and plans for the orderly disposition of surplus equipment without disrupting the national economy are reported in this issue.

See page 16.

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Construction Equipment Salvaged at Navy Depot

STEEL ERECTION ON NEW ALABAMA BRIDGE



The south approach spans for the Foster's Ferry Bridge carrying U. S. 11 across the Warrior River 8.4 miles south of Tuscaloosa, Ala. See page 46.

Methods and Machines Used To Put Worn and Damaged Equipment Back in Service At Southwestern Depot

By FRANK B. SARLES,
Field Editor

(Photos on pages 40 and 41)

♦ IN wartime our Navy is usually considered solely as an agency for the destruction of the enemy. It will be a surprise to many to learn that at the Bureau of Yards and Docks Construction Equipment Repair Depot at McAlester, Okla., a well-equipped and completely staffed organization is engaged in operations which have contributed materially to the Navy's ability to return to the Treasury an unexpended balance from its annual budget.

The utilization of this Repair Depot was suggested by and developed from the repair shops of the contractor who constructed a large and important naval facility nearby. His operation of equipment in spite of wartime scarcity of parts was so outstanding as to merit the attention of Naval authorities. They became convinced that the machines and personnel which had enabled the contractor to complete his large and complex contract with a minimum of delay resulting from equipment breakdowns could be augmented and expanded into a facility of value to the Navy.

This Depot, covering approximately 175 acres located on both the Rock Island and M K & T Railroads, handles the repair and rebuilding of all Bureau of Yards and Docks construction equipment from the 7th, 8th and 9th Naval Districts, comprising twenty-one states in the central part of the United States. Equipment which has been worn or damaged in the construction of Naval facilities throughout this area is shipped to the Repair Depot where it is repaired or, if necessary, completely rebuilt, and once more made useful for further construction activities in the continental United States or at advance bases.

Equipment ranging from cranes and tractors to calculators and surveying instruments is repaired or rebuilt at this station to standards which vary according to the future use for which the equipment is intended. Equipment which is to be shipped to advance bases having limited repair facilities, few spare parts, and above all no time for delays, is rebuilt to the same standards as new equipment shipped direct from the point of manufacture. Our Seabees, who fight to protect what they build, have no time

(Continued on page 26)

Interregional Highway System

Rural and Urban Needs, Extent, Economic Values

Committee Reports Studies Of Several Systems Based On Urban and Rural Areas, Industry and Agriculture

(Photo on page 80)

† THE report of the National Interregional Highway Committee, appointed by the President on April 14, 1941, has recently been released. This is a fortunate time for such an outstanding study to become public property since Congress faces several problems in the post-war highway field. The Committee, of which Thomas H. MacDonald is Chairman, has presented a well-considered program for the construction or improvement of a 33,920-mile integrated highway system which will "join the principal centers of population and industry in each geographic region with centers of similar relative importance in other geographic regions, by lines as direct as practicable".

Need for System

Past mistakes of main-road location and right-of-way neglect are understandable, but their consequences today emphasize the need for designating and preferentially improving an interregional system. For, paradoxically, the country's most important highways, which will constitute the large part of such an interregional system, are the ones that have suffered most in the course of their improvement because of these mistakes.

The explanation of the paradox is that these roads, in recognition of their prime importance, were among the earliest of our highways to be durably improved. Structurally, many of these improvements are still embarrassingly sound; but in location, in traffic capacity, and in the lack of most of the features of modern highway design that makes possible the safe operation of vehicles at high speeds, they are badly obsolescent.

Many of them have long since repaid their cost in the benefits yielded to the heavy traffic that has moved over them. As they are rebuilt, as soon they must be, they should be built to the highest modern standards, on locations and within rights-of-way where they will have the prospect of long and beneficial service. That such an improvement of these main arterial roads of the nation may proceed consistently in all parts of the country, that all may agree upon the particular roads comprising the national routes in all regions and in all states, and that preparations may now be made for beginning the systematic improvement of these roads in the first post-war years—these are the first reasons for an immediate designation of an interregional system.

Traffic Needs Are Now Urban

Twenty years ago when the Federal Highway Act and many of the state highway enactments prohibited the expenditure of limited Federal and state funds for improvement of the trans-city connections of the Federal-Aid and state highway systems, that prohibition was a necessary and logical recognition of the superior need for rural highway improvement. Now, with congestion of the trans-city routes replacing rural highway mud as the greatest of traffic barriers, emphasis needs to be reversed and the larger expenditure devoted to improvement of the city and metropolitan sections of arterial routes. That the particular locations of these routes may be agreed upon in common by Federal,

(Continued on page 10)



On this relief traffic map of the recommended Interregional Highway System, the approximate average density of traffic to be expected at all points along the system is indicated by the height of the traffic bands. The spikes at the principal cities show the great increases in traffic to be expected on sections of the routes traversing these cities.

Traffic Problems Are Urban Rather Than Rural Today: Routes in Metropolitan Areas and Through Cities

† IN the study of the nation's highway needs for its report on an Interregional Highway System, the National Interregional Highway Committee found that nearly 90 per cent of the traffic moving on main highways in this country has either or both its origin and destination in cities; that traffic steadily increases with increased proximity to cities; and that on trans-city connections of main routes traffic mounts to volumes far greater than the general levels on rural sections. Further, heavily traveled sections of a proposed interregional system lie mainly within relatively narrow zones of traffic influence about cities of 10,000 or more population.

Classification of Traffic

The table in column 4 presents an analysis of available data on the urban

or rural termini of traffic observed on main highways. The data were obtained from the highway planning surveys of typical states in seven geographical regions. The analysis shows that, on the average, 49.6 per cent of all traffic observed was moving from one city to another, and 36.6 per cent was bound either from a city origin to a rural destination or from a rural origin to a city destination. Thus nearly seven-eighths of this main-highway traffic in these representative states is related in some manner to cities. Only 13.8 per cent both begins and ends at rural points, and a portion of this movement undoubtedly passes through urban communities en route.

The facts presented in the table relate to all main-highway traffic of both long and short range, including passenger

CLASSIFICATION OF MOTOR TRUCK TRAFFIC ON MAIN HIGHWAYS AND PERCENTAGES OF EACH CLASS ORIGINATED IN OR DESTINED TO CITIES

Region and State	Percentage of Truck Traffic by Classes of Movement			Percentage of Each Class Originated in or Destined to Cities		
	Intrastate Per Cent	Interstate Per Cent	Transstate Per Cent	Intrastate Per Cent	Interstate Per Cent	Transstate Per Cent
All regions, average	75.4	20.0	4.6	87.0	95.5	96.7
New England	58.4	29.0	12.6	80.5	92.9	93.9
New Hampshire	75.4	20.0	4.6	87.0	95.5	96.7
East North Central	70.5	23.6	5.9	94.6	98.8	99.1
Ohio	76.6	20.6	2.8	82.0	93.5	94.0
West North Central	76.2	19.3	4.5	85.9	95.1	98.8
Nebraska	76.4	19.1	4.5	77.4	91.0	94.7
South Atlantic	88.5	10.2	1.3	86.8	95.4	90.4
West Virginia	87.6	11.5	0.9	89.1	95.2	90.4
Tennessee						
Mountain						
Utah						
Pacific						
Washington						

Interregional Highways

Because of the importance to the highway industry of the recently published report by the National Interregional Highway Committee, recommending the designation of a 33,920-mile Interregional Highway System and the improvement of that system to specified design and construction standards, we are publishing in this and subsequent issues a detailed discussion of the report.

The problems entering into the selection of the routes, and the importance of urban traffic, are covered in this article, while access, right-of-way acquisition, design and construction standards, roadside development, and costs will be taken up in later articles.

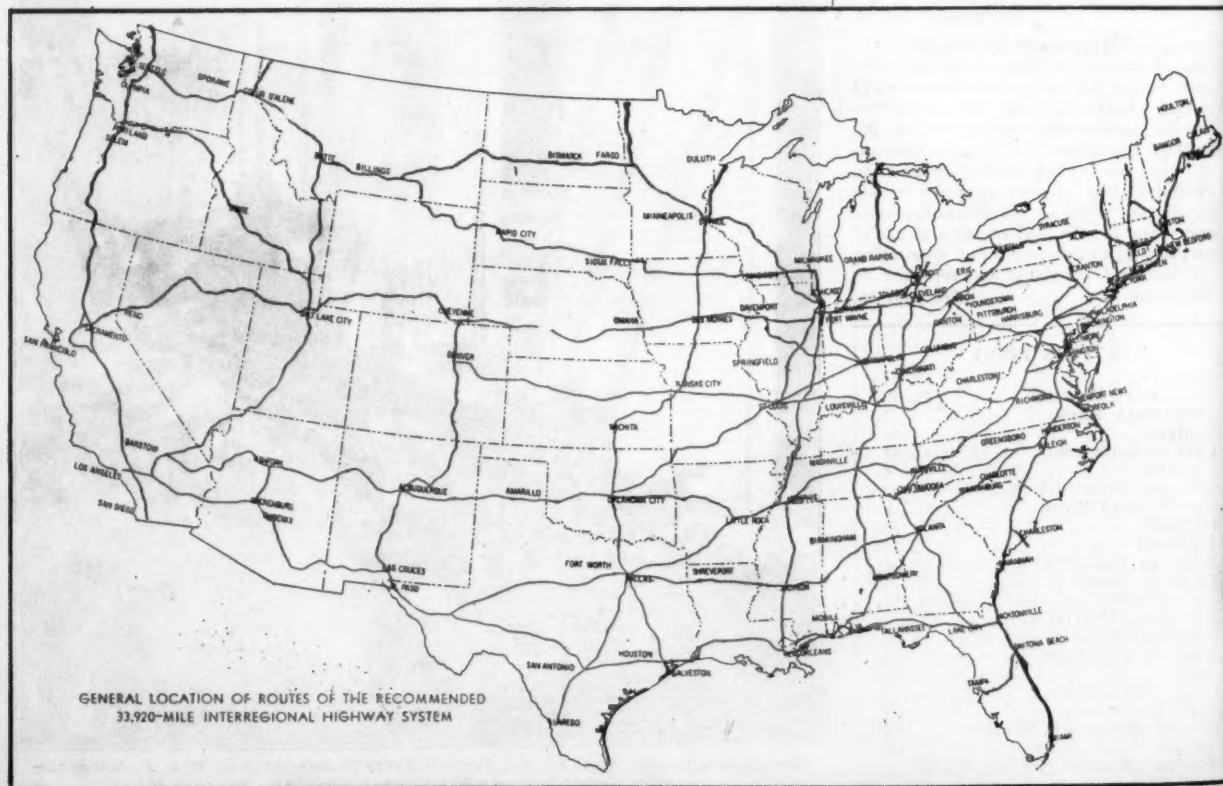
cars, buses, and trucks. The data of the planning surveys do not permit a particular examination in this respect of the long-range traffic of all classes of vehicles.

Region and State	Percentage of All Traffic Having Various Origins and Destinations		
	Origin and Destination Both Urban Per Cent	Origin or Destination Urban Per Cent	Origin and Destination Both Rural Per Cent
All regions, average	49.6	36.6	13.8
New England	35.3	49.1	15.6
New Hampshire	67.5	29.7	2.8
East North Central	49.1	37.9	13.0
Ohio	60.3	25.9	13.8
West North Central	57.8	34.7	7.5
Nebraska	8.7	59.1	32.2
South Atlantic	23.4	46.6	30.0
West Virginia			
East South Central			
Tennessee			
Mountain			
Utah			
Pacific			
Oregon			

For the states represented in the table, however, data on motor-truck traffic are available which permit a classification of the movement according to a general indication of length of trip, as intrastate, interstate, and transstate, and a further analysis of each of these classes according to the percentages of each that have their origins or destinations, or both, in cities.

The term interstate is used to refer to traffic bound to or from the state of observation from or to another state. The term transstate refers to traffic moving entirely across the state of observation between origins and destinations in other states. This applies particularly to states like New Jersey, Connecticut, Delaware, and Rhode Island. The term intrastate is used in its ordinary sense

(Continued on page 36)



GENERAL LOCATION OF ROUTES OF THE RECOMMENDED 33,920-MILE INTERREGIONAL HIGHWAY SYSTEM



Salvage worn
pavements as
Lexington, Ky., did



with

TEXACO
ASPHALTIC
CONCRETE

Constructing a two-course Texaco Asphalt Concrete pavement over worn brick on Broadway, Lexington, Ky.

A worn pavement is like a worn tire. If properly "recapped" before wear becomes excessive, many additional years of satisfactory service are obtained.

When the brick pavement on Broadway in Lexington, Ky., reached the stage where simple patching was inadequate, the city decided that a "recap" job was the answer. Following the example of scores of other American cities, Lexington constructed a new Texaco Asphaltic Concrete pavement over the worn brick.

The new plant-mixed Texaco surface was laid in two courses, each $\frac{3}{4}$ -inch thick.

As a result, at a fraction of the cost of building a completely new pavement, Lexington now has a smooth, resilient, skid-resistant surface on this section of Broadway, which will serve for years.

Texaco Engineers, who are Asphalt specialists, are at your service in the preparation of plans for post-war paving.



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Philadelphia (2) Richmond (19) Boston (16) Chicago (4) Jacksonville (2) Houston (1)

TEXACO ASPHALT

Contractors and Engineers Monthly

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Is the Disabled War Veteran Included in Your Post-War Plans?

It is agreed that there will be a huge construction program after the war. We shall see the Interregional Highway System become a reality, there will be many new public works, and new industries will spring up, born of developments resulting from the war, because that is the American way of doing things. But in all our talk of the biggest program of this or that, we have given too little thought to how each and every industry will contribute to the rehabilitation of the daily increasing number of disabled soldiers, sailors, and marines who are being returned to our shores, handicapped physically and mentally because of their war experiences.

These men must be absorbed into our economic life. They are young and still have ambition, grit, and determination, even though their hopes for returning to the strenuous activities they left to join the armed forces have been blasted. We know that those hopelessly crippled mentally and physically will be cared for by the Federal government in the veterans' hospitals, but the far greater number, who will be "on their own" after temporary hospitalization and treatment, must be absorbed by industry.

We complacently plan for post-war construction, for post-war reconversion of industry to maintain the \$100,000,000,000 national income necessary for the elimination of unemployment, for halcyon days of prosperity and plenty, but we hear scarcely a word about the plans of these same organizations to aid the disabled war veteran to take his place in our economic life. There are those who have lost their mental stability, many of whom can be cured by long periods of rest and the benefits of occupational therapy. But a part of that cure must be the knowledge that they can eventually take their places in the community as useful citizens, capable of economic independence and normal lives. Then there are the thousands who have lost an arm or leg, or are otherwise restricted in their physical activity. Many of these will be unable to fill the jobs they had before the war, but these men too want a chance at a new kind of job, where their physical handicaps won't interfere with their efficiency, and which will enable them to make their contribution to and play their part in the nation's economic, social and cultural life.

We therefore appeal to every manufacturer, every highway department, every contractor, and every construction bureau of government to include in their post-war planning definite assumption of their responsibility to use such disabled men wherever possible. There are many office jobs and many field jobs that can be done by the men who have given their strength and fighting ability "over there"

so that the rest of us could live and work safely and profitably here. Look over the jobs you will have when reconversion starts and the post-war construction program gets under way, and decide now how many can be done by the fighters who have been disabled and, after that, how many require able-bodied veterans and others who will be available for those post-war jobs. A thoughtful survey of the situation will show up a surprising number of jobs, both office and field, which really do not demand 100 per cent physical fitness. Make a classification of the jobs in your organization, grouping them according to physical handicaps which will not interfere with the efficient prosecution of the work. And in the days ahead, when competition is keen for the jobs available, get out that classification and give the veterans with handicaps a chance at them.

Make these men a part of your post-war planning and thus keep faith with the millions of young men who went out to fight our war for us, men who did not seek the safest spot at home, men who

Build Public Works Of Permanent Value

It is of the utmost importance that any public works projects undertaken in the post-war years to relieve sharp dislocations during the economic reconversions should be projects of permanent value quite apart from their immediate employment-giving qualities, according to Harold D. Smith, Director, Federal Bureau of the Budget, speaking at the 41st Annual Meeting of the American Road Builders' Association at Chicago, Ill., February 2, 1944.

In recent years, because of the emphasis placed upon immediate contributions to employment and purchasing power, we have frequently lost sight of the simple fact that we should build public works primarily because we need the public services such works will provide after completion. In the final analysis, we should build highways, for example, because we need these facilities for public transportation purposes. We should build river control works to protect lives and property or to exploit untapped re-

sources by bringing water to arid lands. gallantly met the Germans or the Japs at their worst, and made their contribution to final Victory before insect, bacteria, bullet or shell finally put them into the casualty list. Let us hear what you are doing. It will give hope and inspiration to those already injured and courage to those who are yet to join their comrades in the hospitals.

If you have taken a long-haul railroad trip recently, you have probably seen the extra cars at the rear of the train, or have been side-tracked for a long hospital train to pass, bearing the wounded on their long and weary journey back to some hospital at home where they will be patched up physically by experienced surgeons and mentally by trained psychiatrists and occupational therapists. At such moments it is easy to become emotional about our wounded veterans, but all the fine phrases of ardent admiration of "our boys", the eloquent tributes to their courage and gallantry, are shallow and meaningless, unless we offer practical aid in providing an opportunity for them to resume a productive and normal life.



"Which shovel operator? There's two of us, you know!"

sources by bringing water to arid lands. If we can adjust the timing of construction so as to have both the permanent benefits and the helpful temporary effects in providing needed employment during the building, so much the better. But, primarily, our objectives should be the public service values of the works themselves—the benefits in protecting our health and safety, in providing essential services for our daily living, and in developing new opportunities for employment and investment. It is these values that make the real contribution in increasing our standard of living.

War Construction Program Nears End

At the beginning of 1944, the Corps of Engineers, Army Service Forces, had \$172,000,000 of construction remaining to be completed out of the \$11,000,000,000 war program begun in June, 1940, according to a recent announcement by the War Department. Designed to provide the Army with troop housing, training facilities, and industrial plants, the huge construction program reached its peak intensity last summer. Of the total remaining to be completed, there are 187 major projects, involving estimated expenditures of \$112,000,000, while the remaining \$60,000,000 will be required to complete 2,283 jobs classed as minor, that is, costing less than \$500,000 each. The downward trend of new construction is indicated by the dollar volume of work authorized during December, 1943, which was only 12 per cent of that authorized in the first month of 1943. Barring serious military reverses, the prospects are for a continuation downward.

Though most of the larger projects will have been completed by the end of this month, and practically all presently authorized construction will be finished by the end of June, 1944, a certain amount of routine war construction is anticipated as long as the war continues, due to changing military requirements. For example, an Army airfield designed for pursuit or light bombardment planes might be needed to base heavy bombardment, and the conversion would require modification and strengthening of the parking areas, taxiways, and runways. Construction incidental to the maintenance and repair of Army installations is estimated at \$98,000,000 for the current fiscal year, included in which budget are items of new construction involving less than \$1,000 each.

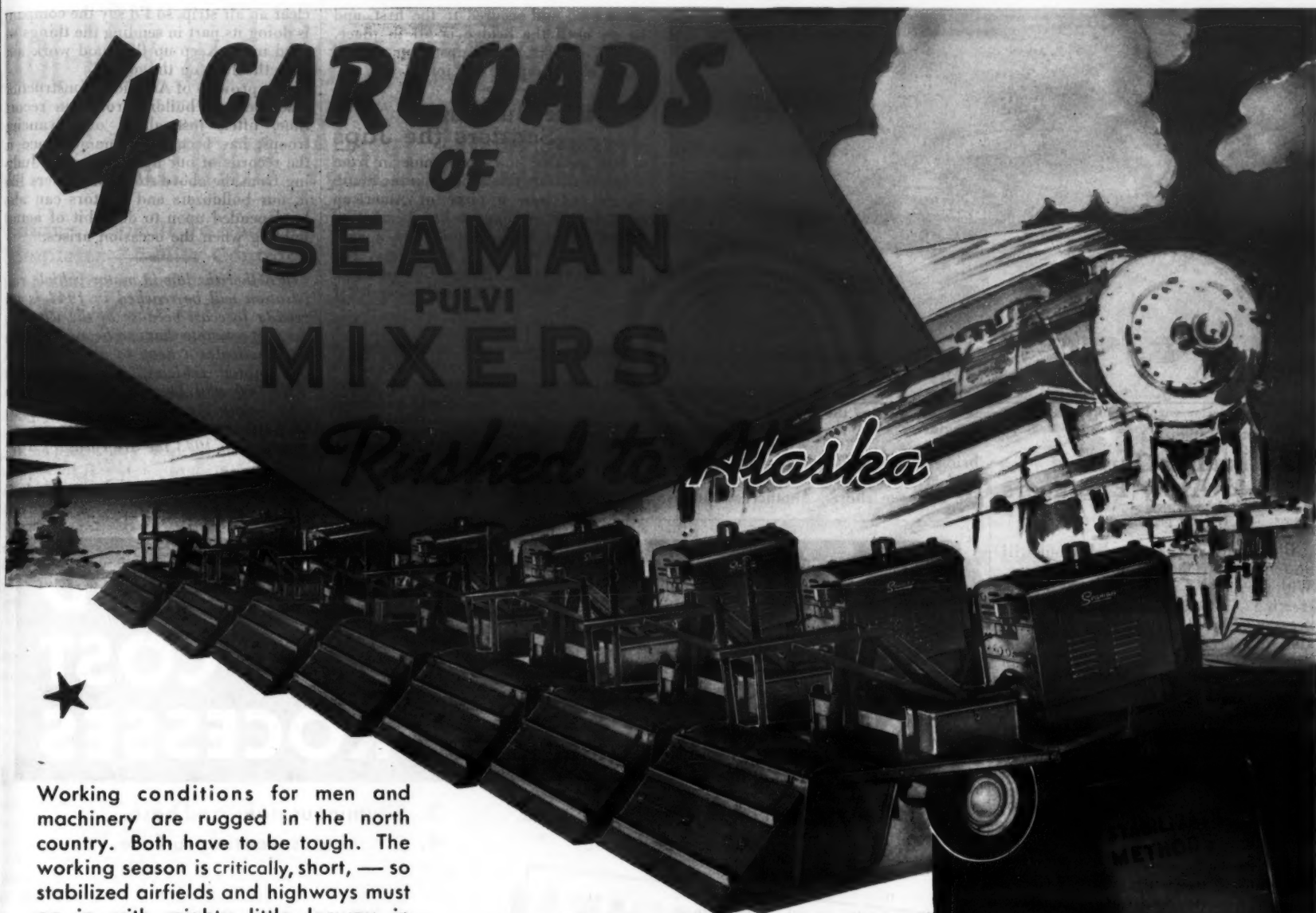
In its civil works program, the Corps of Engineers is compiling a backlog of potential post-war river and harbor, flood-control and multiple-purpose heavy-construction projects totaling \$4,500,000,000. Of this total, projects amounting to \$160,000,000 have already been authorized but were deferred to save man-power, equipment and materials. The remainder of the backlog includes projects approved by Congress and projects recommended to Congress both contingent upon Congressional appropriation.



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Working conditions for men and machinery are rugged in the north country. Both have to be tough. The working season is critically short, — so stabilized airfields and highways must go in with mighty little leeway in schedule. And the job must be right to withstand severe climatic conditions.

Heavy rainfall during the working season handicaps construction, for the aggregate used in asphalt stabilization must be dried quickly and thoroughly during the limited times that Nature turns off the spigot.

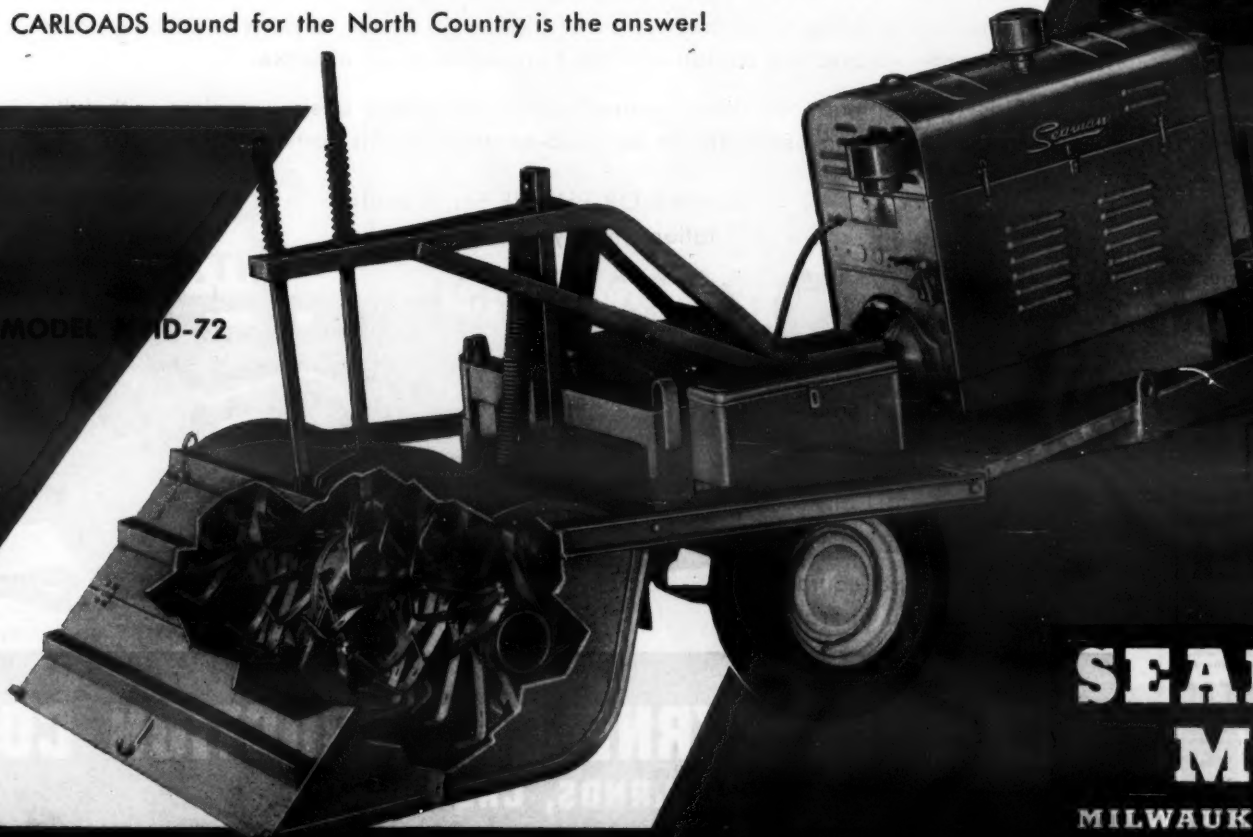
So, when a large Alaskan contractor looked for a machine that would keep going under the toughest condition;—that would fit into the asphalt construction picture and would,—at the same time aerate and dry the aggregate at far less cost than by other methods—they picked the SEAMAN MIXER.

4 CARLOADS bound for the North Country is the answer!

The new, 1944 edition of Soil Stabilization Methods is off the press. This handbook,—compiled by Seaman engineers—is now revised to include the latest information in the soil stabilization field. Your copy awaits your request. Just ask for Bulletin E-24.



MODEL MD-72



SEAMAN MOTORS

MILWAUKEE, WISCONSIN



A heavy carrier with bridge-building body and crane, built by the Heil Co. for use by the U. S. Army Engineers.

New Bridge Carriers Aid Army Engineers

(Photos on page 80)

Blown-up bridges may delay but will no longer prevent pursuit of the enemy. With the aid of a newly-designed bridge-erecting unit, the Army Combat Engineers can build pontoon bridges, capable of carrying the heaviest mechanized equipment, in record time. As an example, at recent maneuvers the 22nd Armored Engineer Battalion built a 330-foot bridge of rubber and steel in a fraction over three hours.

This special steel carrier body, 31 feet long, 9 feet high and weighing 26 tons loaded, with its 8,000-pound capacity crane, is especially built by The Heil Co., Milwaukee, Wis., for mounting on a Brockway army truck. Each big truck carries pontoons, steel saddles, and four 2,000-pound treadways for 30 feet of bridge. The Heil-built crane is 14 feet long, hinged at its base, and is hydraulically controlled. Installed just behind the front bumper of the carrier is a 25,000-pound Heil-built double-drum winch. When it is necessary to place treadways from a high bank or cliff to a point lower than can be reached with the regular crane chains, the cable from the Heil winch is threaded through a snatch block fastened at the end of the crane's load chains so that equipment may be lowered considerably beyond the normal range of the boom.

When the first truck backs into position at the bridge site, a big Seiberling pontoon is taken out, unrolled to its full 33-foot length, and inflated by the truck-mounted compressors in five minutes. Bulkheaded air compartments keep the pontoon afloat even under air attack. The next step is to fit the steel saddles snugly over the pontoons and secure them by straps. Then come the perforated steel treadways, 15 feet long and 2 feet wide, and with high guard rails, which are adjusted on the pontoons and bolted together. Two pontoons with a pair of treadways make a 15-foot section, and when three sections, 45 feet of

assembled and secured to the first, and so on until the bridge is all in place. Heavy anchors placed upstream to hold the bridge complete the job.

Another Bulldozer Scatters the Japs

Still another story has come in from a fighting front, this time from the South Pacific, of how a piece of American construction equipment has been used as an active fighting unit, and a very effective one in routing the enemy. The Buckeye Traction Ditcher Co., of Findlay, Ohio, received the following letter from Pvt. K. L. Betts:

"... we had two pillboxes that were impossible to take, so, as they had a bulldozer about four miles away, we brought it up and by raising the blade, charged the boxes. You should have seen those little rats run. We are still laughing at the way they left in such a hurry. Now let me tell you the strange part—on the side of the blade was Buckeye, and a nice big winch on the back. We used it to

clear an air strip, so I'd say the company is doing its part in sending the things we need most. Keep up the good work and keep the Japs on the move."

The prowess of American construction machinery in building roads in record time, often just ahead of advancing troops, has become a commonplace in the records of our fighting forces. Judging from the above story and others like it, our bulldozers and tractors can also be depended upon to do a bit of actual fighting when the occasion arises.

Whether the low in motor vehicle registration will be reached in 1944 is not readily forecast because of the war, but the best estimate that can be made at this time indicates a drop to about 28,400,000 motor vehicles, of which about 4,400,000 will be trucks, or 17.6 per cent below the peak registration year of 1941. In 1942 the drop was 5.5 per cent and in 1943 the drop was 11.5 per cent.

—H. E. Hiltz, Deputy Commissioner, Public Roads Administration.

bridge, have been joined, they are ferried across the stream and fastened on the opposite shore. Another section is

THE GARDNER METHOD PRODUCES LOWEST COST IN ALL FOUR PROCESSES

1. Soil cement or cement treated base.
2. Mechanically stabilized base.
3. Bituminous stabilized base.
4. Bituminous wearing surface.

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1. HANDLE windrows up to 6 cubic feet of various sizes of aggregate.
2. OPERATE at a speed of from 60 to 100 lineal feet per minute.
3. CONTROL the addition of moisture or bituminous content to .5% of total required.
4. RE-MIX material if necessary.

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A Gardner Mixer equipped for soil cement operation.

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REDLANDS, CALIFORNIA

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Hot-Mix and Rock Asphalt Resurface Worn Pavement

**Indiana Asphalt Paving Co.
Completes 7.5-Mile Contract
in Southern Indiana; Plant
Electrically Driven**

By THEODORE REED KENDALL,
Editor

WHEN a road begins to show high maintenance costs because it is breaking under heavy war traffic and requires almost constant patching, something has to be done about it—even in wartime. The contract of the Indiana Asphalt Paving Co., of Indianapolis, Ind., for widening and resurfacing 7.5 miles of old penetration macadam on an 18-foot one-man-stone base is typical of the salvage contracts awarded by the State Highway Commission of Indiana in 1943, totaling 170 miles.

On this work between Dale and Huntingburg, the old road was widened by rooting the shoulder and blading out the material to form the widening trench. Then steel forms were set for the bituminous widening strip 2 feet 3 inches wide on each side, and the 6-inch depth of bituminous-concrete hot-mix base material was laid in two 3-inch layers and compacted in place by trench rollers.

The Resurfacing

The binder course of the resurfacing operation was laid 22 feet 6 inches wide in one 2-inch layer and topped with a 3/4-inch rock-asphalt wearing course. To insure adhesion of the binder course to the old pavement and the two widening strips, the entire road was first swept by a Detroit rotary broom mounted on the front of an Allis-Chalmers tractor. Then the surface was primed with 0.06 gallon of RC-2 asphalt per square yard applied by an 800-gallon South Bend distributor mounted on a Studebaker truck. The prime was spread down one half of the road and then back on the other half for the approximate distance to be covered by the binder in one day's work, thus priming the full 22-foot 6-inch width.

The 2-inch binder course was spread by an Adnum Black Top Paver with a strike-off screed having a 6-inch stroke. The batch hauling trucks dumped enough material to fill the hopper, then lowered the dump body and were pushed ahead by the Adnum. Two men took care of the feeding of the hot-mix material from the truck to the hopper, under the direction of the Adnum operator. The foreman watched the screed and the side gates to be certain that sufficient material was left to make a good joint or to supply any extra material needed. A pressure-type hand spray was kept on the Adnum to apply an emulsion to the



C. & E. M. Photo
A 2-inch binder course for resurfacing between Huntingburg and Dale, Indiana, was laid down by this Adnum Black Top Paver.

rollers to prevent their sticking to the freshly spread hot-mix. Two rakers, one at the center and one along the edge of the road, made the joint between the two lanes as spread and set the material with the back of the rake along the edge. A 2 x 4 with a handle was used as a

straight-edge to check the grade between the first and second lanes of resurfacing.

There were several long curves on the 7.5-mile contract where the surfacing was widened to meet state specifications. Two extra shovel men were used to

(Concluded on page 14)

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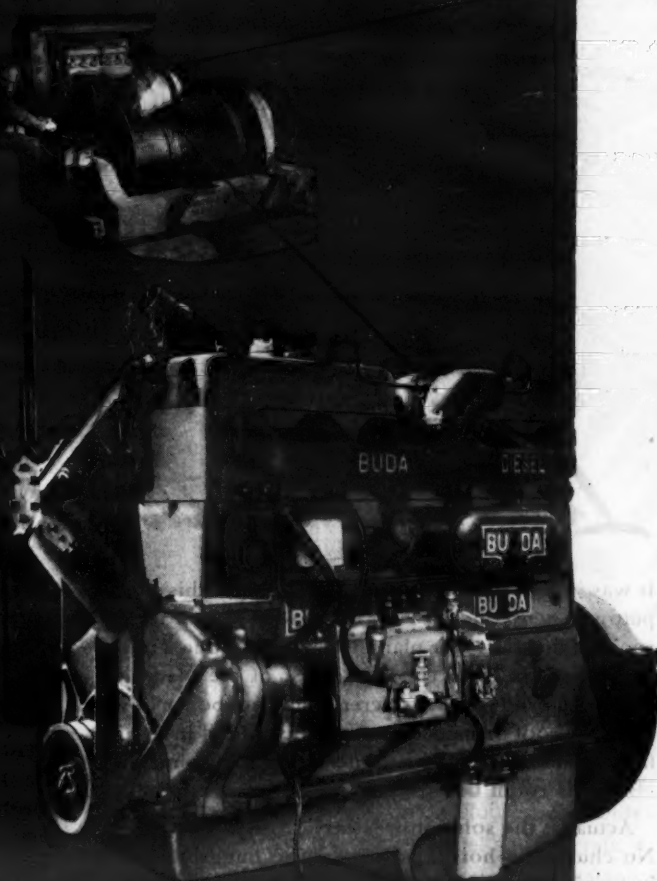
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U. S. Army Air Forces Photo

This small Adams leaning-wheel grader was especially developed for the Aviation Engineers of the Army Air Force. Many units of construction equipment have been designed for air-borne service, to be flown to airfields captured from the enemy for quick repairs to make them usable by our planes.

Prevention of Rust By Special Coatings

In the early days of research work on means of rust prevention, A. C. Bean, President, Tnemec Co., noticed that reinforcing bars imbedded in dense concrete were entirely preserved for an indefinite period. A study of this condition indicated that the sand and gravel in the concrete could not produce this rust-prevention effect, it was obvious that the water used in making the concrete would promote rust rather than retard it, and therefore it must be the chemical action of the portland cement which caused the favorable result. After much experimental work, there was added to cement a proper amount of elements which would produce a pigment having the strongest combination to kill the action of rust. This product was not cement, but to provide a name for it, the word cement was written backwards, forming the word Tnemec, which is the name by which these coatings for preserving steel structures and steel surfaces are now known.

A wide range of Tnemec coatings to meet a variety of conditions has been developed. In addition to protection against rust, special coatings are available for protection against gas and also, for use in the southern coastal states, a mould-proof coating to prevent the discoloration caused by mould fungi. The standard product for the prime coat on steel surfaces is Tnemec 6-R Red Primer. For the prime coat when top coats are to be white or light shades, No. 0433-R Gray Primer is available. In cases where lack of drying time is an issue, there are 99 Metal Primer, and 01009 Gray Metal Primer, each of which is ready to apply by brush as it comes from the container.

In addition to pigment coatings, for

metal, there is also a line of Tnemec weatherproof coatings for concrete, brick, masonry, and similar materials

exposed to weather conditions.

In general, the Tnemec Co. has not engaged in the manufacture of trade sales paints and coatings, but rather has done a "prescription type" of business, developing special coatings to meet specific problems. Of course, as good results have developed with one client, the same procedure and specifications may prove helpful to others with the same problems. Tnemec field engineers are constantly in touch with maintenance problems in all parts of the country, and mimeographed and printed bulletins outlining successful time-proved methods of application and good workmanship in the use of Tnemec are available.

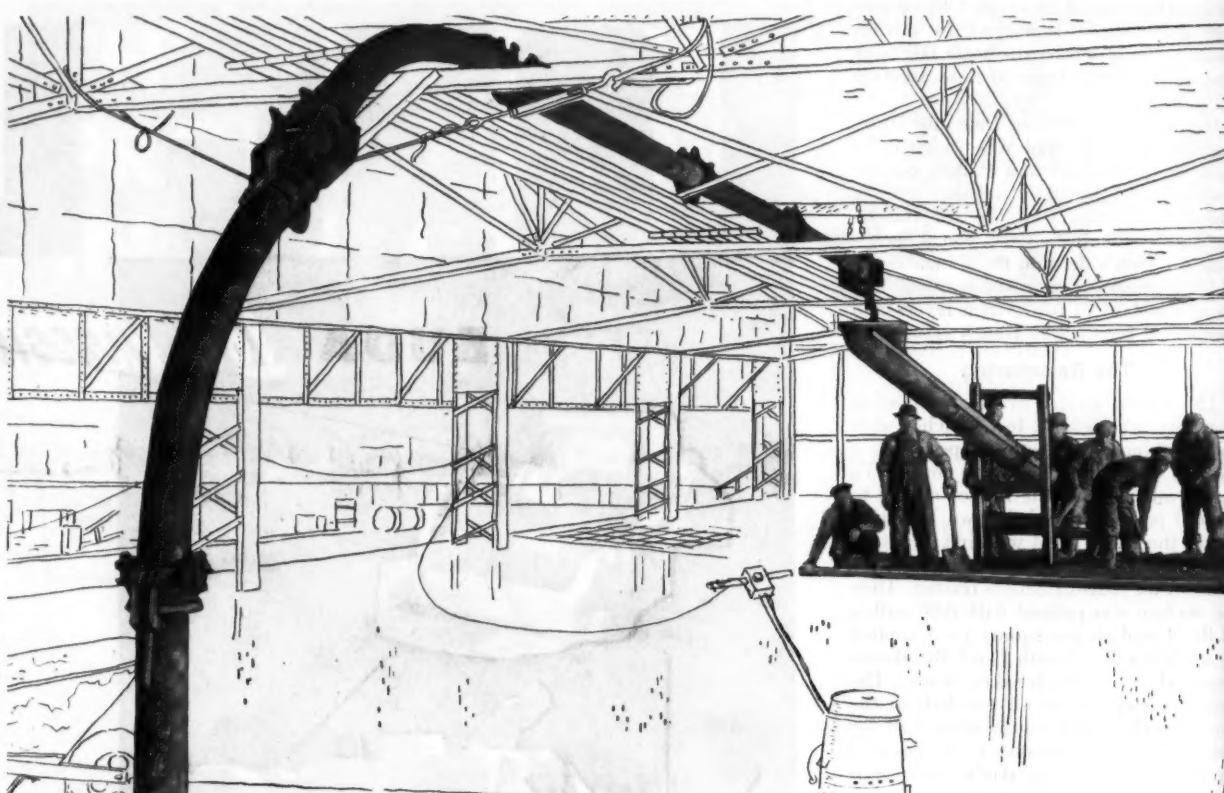
Copies of Catalog No. 41, outlining the Tnemec service and the various types of coatings which have been developed, may be secured by state and county highway engineers and contractors direct from the Tnemec Co., 3122 Roanoke Road, Kansas City, Mo. Or if you have a specific maintenance problem, write to the company about it and information

which should prove helpful to you will be sent promptly. Just mention CONTRACTORS AND ENGINEERS MONTHLY.

Highway Dummy Joints Of Asphalt Mastic Board

A new folder describing and illustrating Keystone asphalt mastic board dummy joints, which can be used transversely or longitudinally, has just been issued by the Keystone Asphalt Products Co., 43 E. Ohio St., Chicago 11, Ill. These joints are $\frac{1}{8}$ inch thick and are furnished in full-size sheets scored to the required widths, the strips are broken off as needed, and can easily be installed by one man, the folder states. These Keystone joints are made of a homogeneous asphalt material which is waterproof and designed to obtain the maximum of rigidity.

Copies of this new folder on Keystone asphalt mastic board dummy joints may be secured without obligation by writing direct to the manufacturer and mentioning this item.



Like Putting the YOLK IN AN EGG...

It was just like putting the yolk in an egg, this job of putting a new concrete floor in the second floor testing room of this busy war plant. It had to be done without disturbing the workers in the rest of the plant and impeding production. Concrete could not be run down from the roof or hauled up from the ground in an old-fashioned manner without interfering with somebody—for this room was truly in the middle of the plant.

Actually, the solution was easy... Rex Pumpcrete. No chutes, no hoists, no towers, no buggy runs... just a pipe line. The pipe line was run from the Pumpcrete through one of the first floor windows, up through the ceiling and along the second floor to the testing room. The Pumpcrete pumped concrete through

the pipe line in a fraction of the time it would have taken with old-fashioned methods.

To simplify your difficult concrete placing jobs... to speed up placing time... check Rex Pumpcrete. It pumps concrete vertically as high as 120 feet or horizontally as far as 1200 feet.

For complete information on Rex Pumpcretes, send for descriptive bulletins. And check the other Rex construction equipment: Moto-Mixers, to speed the mixing, hauling and placing of concrete... Pumps, that move water economically and efficiently... Mixers, that cut concrete mixing costs... Pavers, that can give you really heavy yardage production, faster. See your Rex Distributor or write direct to Chain Belt Company, 1664 West Bruce Street, Milwaukee 4, Wisconsin.

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Improved Drainage At Southern Airport

Army Installs System of Erosion Control with Flat Concrete Gutters and Sod; Unique Sprig Sodder

THE Jacksonville, Fla., Municipal Airport, quickly improved during 1942 for emergency use by the Army Air Forces, was further improved during 1943 in accordance with a logical program of betterment. The latest work consists of measures taken to control the serious maintenance and safety problem caused by the erosion of runway shoulders and slopes in the hilly terrain and sandy soil of this location.

The original improvement to convert this municipal airport to use as a tactical field by the Eastern Defense Command consisted primarily of the extension of runways. Because the field is located in an area of wind-blown sand dunes, the extensions required heavy grading operations with cuts as deep as 50 feet and fills up to 30 feet in height. One runway could not be extended because of natural obstacles so it was replaced by a parallel runway in a different part of the field.

The extensions were made with plain concrete, varying in section from 10-7-10, through 8-inch uniform, to 12-8-12 inches of thickness. The original runways were strengthened by the construction of lime-rock bases having a compacted thickness of 10 inches and topped with 3 inches of asphaltic concrete constructed in two courses. All new runways and improvement to the existing runways were designed for a wheel load of 60,000 pounds. The areas under the new runways and for a width of 75 feet on each side of all runways were stabilized by the addition of approximately 35 per cent of Crystal River screenings, disked, harrowed, and rolled into the top 12 inches of subgrade. A California bearing ratio of 80 was obtained by this treatment, which was extended to include the runway end zones which were also fertilized and sprig-sodded. The stabilized areas adjacent to the runways were primed with an application of 0.3 gallon of MC-3, which gave a deceptive appearance of strength to these areas and almost proved disastrous to bomber pilots who on some occasions landed on them. During subsequent improvement this condition was changed, and this operational hazard, caused by the very similar appearance from the air of two contiguous areas having widely dissimilar bearing values, no longer exists.

Perimeter taxiways connecting all runways and hard-standing dispersal areas were also provided by the original improvement program, and housing units with appurtenant buildings were constructed, as was a 205-bed hospital to care for the operating garrison.

The responsible officers deserve credit for the fact that all of this construction, entailing intense concentration of personnel and equipment, was completed in fast time and with a perfect safety record, although the field was in constant

use by commercial airlines and Army planes.

The Betterment Program

As a part of the continued program of betterment to this important airport, it was decided to construct systems of concrete gutters by which the surface drainage could be carried to the storm-sewer system without causing damage to the sandy slopes and ditch bottoms of the area. With the rather heavy grades, some as high as 1.5 per cent, existent on the runways, and the sandy nature of the entire unsurfaced portions of the field, the problem of erosion was a serious one.

To alleviate this condition, concrete gutters were constructed, parallel to and 75 feet from the edges of all runways.



C. & E. M. Photo

Sprig-sodding with the "Rube Goldberg" at the Jacksonville Municipal Airport.

The gutters are in the form of a shallow trough, varying in width from 17 to 27 feet, and with their high edges set uniformly 9 inches below the edges of the runways. It was believed that water flowing from the runways into the gutters would not attain sufficient velocity to erode seriously the sodded shoulders, and that the water could be carried in

the paved gutters to accessible points of discharge into the storm-sewer system.

The gutter locations were graded by tractor-drawn scrapers, and after the setting of the 4-inch steel forms, were fine-graded by hand and checked by a trussed template shaped to the form of the subgrade and resting on the side

(Concluded on page 22)



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Several Mileages Studied For Interregional System

(Continued from page 2)

state, county and municipal authorities who will share the responsibility for arterial highway improvement, that the desirable standards of the improvement may be established and commonly accepted, and that plans may at once be laid for a prompt post-war beginning of the highly essential construction work—these are other compelling reasons for the designation of an interregional system.

The cities and metropolitan areas of the country are known to include the sources and destinations of the greater part of the heavy flow of traffic that moves over the nation's highways. The system of interregional highways proposed, within the limits of the mileage adopted, connects as many as possible of the larger cities and metropolitan areas regionally and interregionally. For this reason, although in miles it represents scarcely over 1 per cent of the entire highway and street system, it will probably serve not less than 20 per cent of the total street and highway traffic.

Several Systems Studied

The Committee had for its consideration all the data amassed by the Public Roads Administration for its report "Toll Roads and Free Roads", which was transmitted by the President to the Congress in 1939 and published as House Document No. 272, 76th Congress, 1st Session. In that report two systems were defined, one of approximately 14,200 miles and the other of about 26,700 miles. The latter was proposed as an interregional system.

Subsequently, the Public Roads Administration reexamined its data and made minor changes and small additions to the published system, increasing its length to 29,300 miles. The facts suggesting these changes were available for the Committee's review, as were also the voluminous data gathered for selection of the strategic network of principal highway routes shown on a map approved by the Secretary of War, as revised May 15, 1941.

Finally, at the Committee's direction, a staff supplied by the Public Roads Administration made studies of three additional systems, one of approxi-

mately 48,400 miles, one of 36,000 miles, and one of about 33,920 miles, which is the recommended system.

In the selection of all of these systems, one common objective prevailed: to incorporate into each of the several mileage limits adopted those principal highway routes which would reach to all sections of the country, form within themselves a complete network, and jointly attract and adequately serve a greater traffic volume than any other system of equal extent and condition.

Obviously, it is not possible by any limited highway system, whatever the relative importance of its constituent routes, to serve all the needs of the nation's traffic. Nor is it reasonable to assume that in and near cities the routes included in such a limited system will, if improved, provide a complete solution

to the serious problem of city traffic congestion. Particularly in the cities, many other routes are probably of substantially equal if not greater importance, and improvement of the system routes should, therefore, not be advanced ahead of others of similar or greater local importance. In this connection, the Committee has been restricted in its choice because it was directed to select an interregional rather than a local system, and to consider national above local needs.

The System Chosen

The general location of the routes comprising the recommended Interregional Highway System is shown on the map on page 2. The total length of the system is approximately 33,920 miles. This represents 1.04 per cent of the 3,267,717 miles of rural roads and urban streets in the United States. The approximate length of the rural sections of the system, 29,450 miles, is 0.99 per cent of the 2,964,677 miles of rural roads. The approximate length of urban sections,

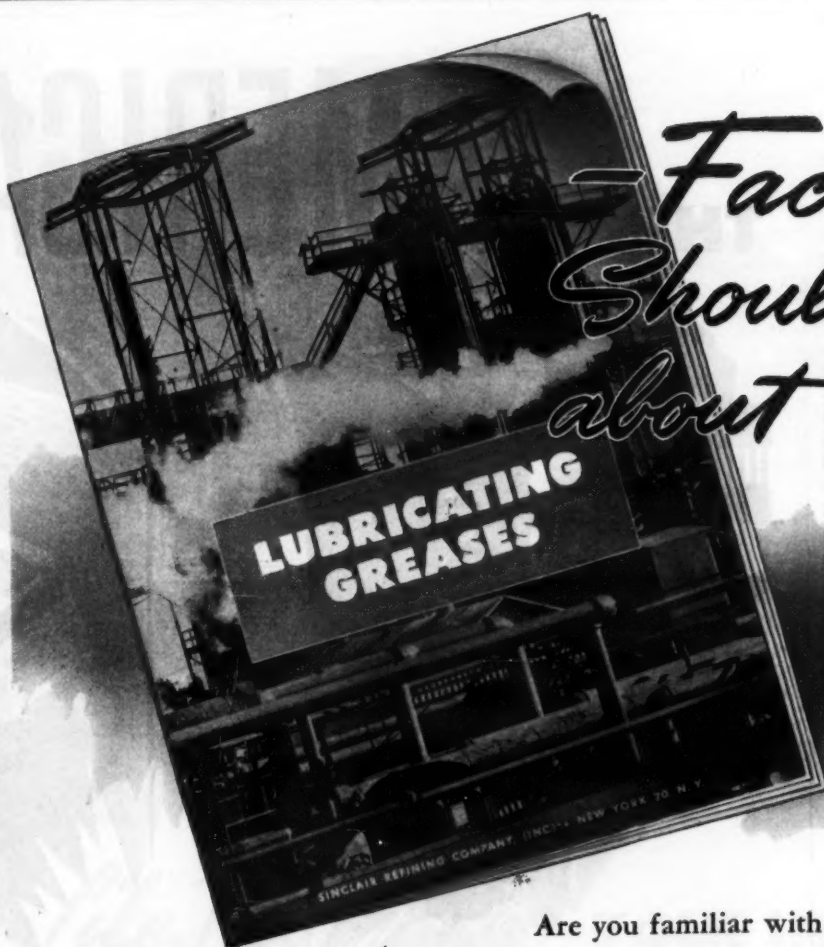
4,470 miles, is 1.48 per cent of 303,040 miles of urban streets.

The recommended system connects directly all cities of 300,000 or more population, and is the smallest system that provides these connections. It reaches 59 of the 62 cities of population between 100,000 and 300,000 persons, and is superior in this respect to the 48,300-mile and 78,800-mile system previously investigated by the Public Roads Administration.

The recommended system reaches directly only 82 of the 107 cities of population between 50,000 and 100,000. The 48,300-mile system reaches only 91 and the 78,800-mile system only 95 of the cities of this size, and hence are little superior to the recommended system.

It is mainly in their connections with cities under 50,000 population that the 48,300 and 78,800-mile systems show marked superiority to the recommended 33,920-mile system. The latter connects 121 of the 213 cities of population between 25,000 and 50,000, as compared

(Continued on next page)



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**CONTINENTAL
RUBBER WORKS**

ERIE, PENNSYLVANIA, U.S.A.

Factors Affecting Choice Of Interregional Routes

(Continued from preceding page)

with 147 connected by the 48,300-mile system and 180 by the system of 78,800 miles. The recommended system reaches directly only 295 of the 665 cities of 10,000 to 25,000 population, whereas the 48,300-mile system reaches 351, and the 78,800-mile system 444. Thus, not even the largest of the systems studied is sufficiently extensive to reach all cities of these two smallest population groups. To reach all cities of 10,000 or more population, it has been determined that the largest system investigated would have to be increased by 14,100 miles.

Any effort to reach a larger number of cities under 50,000 population than are connected by the recommended system, it is believed, must result in a lowering of the average traffic volume served by the system as a whole. The gain to a few of our smaller cities would, therefore, be accomplished at the expense of a diminishing return in traffic service for the system as a whole. The Committee decided this would not be warranted.

Relations to Economic Factors

Population Distribution. The location of the proposed Interregional System in relation to population distribution is important. A statement of the number of cities reached directly by the recommended system does not convey an entirely adequate impression of the nearness of approach of the system to the homes of a large proportion of the urban population of the United States. Although only 54.5 per cent of all cities of 10,000 or more population are located directly on the system, the aggregate population of these cities is 82.6 per cent of the total urban population of the nation. With slight exception in two instances, the cities directly connected are the largest of their respective population groups. The various routes not only have their principal local termini or hubs in the larger cities but also, en route between these hubs, pass through or very close to the denser clusters of population in rural areas and small towns. If service to population is considered important in the choice, the recommended routes are in most instances the inevitable selections.

That such service would be provided is indicated by the map on page 18 which shows by intensity of shading the gradation of average density of rural population, county by county. The remarkable manner in which the recommended routes trace their courses along the country's most populous bands of rural territory is apparent at a glance. Few if any instances occur in which the recommended route locations can obviously be materially improved, except by excessive duplication of local mileage.

Manufacturing Activity. Unquestionably any limited system of interregional highways that may be designated should, within the limits of mileage adopted, provide transportation facilities for as much as possible of the manufacturing industry of the country. Where manufacturing activity exists in greatest volume, there it may be assumed

are the points of origin and destination of the greatest volumes of motor-truck traffic. The Interregional System should provide for the service of this traffic as well as passenger-car traffic.

In expressing this view, however, the Committee does not suggest that there is need of special highway facilities for the accommodation or encouragement of long-distance trucking. All the evidence amassed by the highway planning surveys points to the fact that the range of motor-truck hauls is comparatively short. There is nothing to indicate the probability of an increasing range of such movements in the future. The length of truck hauls will be determined in the future, as it has been in the past, by the competitive advantages at various distances of other modes of transportation. The probable early develop-

ment of an efficient commercial air-freight service, together with the keener competition of a rejuvenated rail service, would seem to forecast a future shortening rather than a lengthening of average highway freight hauls.

The volume of highway freight movements in the future may be expected to be greatest on highways joining the centers of greatest industrial activity. Such highways should be incorporated, as far as possible, in the interregional system.

To test the adequacy of the recommended system from the standpoint of industrial transportation, the Committee has used the census reports of values added by manufacturing industries located in the various cities of the country as a measure of the relative manufacturing activity of these cities and of the relative probability of inter-city highway freight movement. It was found that there are only slight differences in the relative importance of cities when they are measured on the one hand by their population and on the other by

the values which are added by their manufactures.

It has been found that the cities of 10,000 or more population connected by the recommended system are, in general, the more important manufacturing cities. Numerically only 54.5 per cent of all cities of more than 10,000 population, they account for 83 per cent of the total value added by manufacture in all such cities. In contrast, the system reaching all of the cities is nearly three times as large and serves only an additional 17 per cent of manufacturing activity. It is, therefore, concluded that the recommended system closely approximates the system of optimum extent from the standpoint of service to manufacturing industry.

Agricultural Production. The recommended system traverses 1,056 or 34.3 per cent of the 3,076 counties of the United States and these counties include the places of residence of 45.2 per cent of the total rural population of the country. On further examination, it is

(Continued on page 18)



PORTER W. YETT reports:

We are more than satisfied with the operation of our 4000-lb. Madsen Plant. In considering the purchase of a plant to meet our requirements, which was the construction of over 100,000 tons of asphaltic concrete roadways and facilities for three of Henry J. Kaiser Company shipbuilding plants, requiring speed and more speed, continuous operation and dependability. We, after careful consideration, selected Madsen which has more than made good. One of our best production records in one shipbuilding plant was 33,000 tons of 2 1/2-inch asphaltic concrete to Oregon State Highway specifications in 26 light-hour days without one breakdown.

We are glad we bought a Madsen Plant.

...depend upon Madsen

When Porter W. Yett wanted speed and more speed to mix 100,000 tons of asphaltic concrete for the Henry J. Kaiser Company shipyards, he chose a Madsen Asphalt Plant. Why? Because Madsen plants have the pressure-injection system... the fast-dumping mixer gate... the synchronized plant operations and five other exclusive Madsen-patented features — time-savers that have been developed over a period of twenty-nine years.

On one project, Mr. Yett's plant mixed 33,000 tons in 26 light-hour days to Oregon State Highway specifications without a breakdown.

Only tons talk where asphalt plants

are concerned — here's what other Madsen Plant owners report:

"It is not unusual to mix in excess of 200 tons per hour with our 3000-lb. Madsen plant."

"We produced 149,121 tons in 8 months with our 3000-lb. Madsen Plant."

"We mixed 75,920 tons from October 1 to December 8 with our 3000-lb. Madsen Plant."

"We have consistently mixed 3500-lb. batches with production reaching 200 tons per hour."

Bona fide letters from which these excerpts were taken are available. Plan for tomorrow today; write for the new Madsen plant catalog — MP-120.

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Winter Maintenance In St. Louis County

Equipment for Snow Removal; Its Maintenance and Use Under Wartime Conditions In Northern Minnesota

♦ A HIGHWAY system more inclusive and longer than those of several of the more sparsely populated states is maintained on a year-round basis by St. Louis County, Minn. Here, in one of the largest counties in the United States, 3,575 miles of highway are open to travel day in and day out a full twelve months of the year.

St. Louis County, extending more than 100 miles from its western boundary to Lake Superior and more than 200 miles from its southern border to the Canadian line, is larger in area than some of the Atlantic seaboard states. Within the county lie the richest of the nation's deposits of iron ore. At Duluth and Two Harbors on Lake Superior are some of the finest inland dock facilities in the country. Not only is Duluth one of the most important ore docks in the nation, but its facilities for handling coal and grain rank with the best.

Linking the hundreds of villages, towns and cities of St. Louis County is a well constructed and well maintained system of state and county roads. Maintenance of the many hundreds of miles of state highways in the county is, of course, the responsibility of the Minnesota State Highway Department. But far exceeding the mileage of trunk highways is the network of county and township roads, constructed and maintained under the direction of the St. Louis County Highway Department, with headquarters at Duluth.

With a total highway system of more than 4,000 miles, the county opens for winter travel almost 90 per cent of the total, or 3,575 miles. This county highway system breaks down into the following categories:

Concrete pavement.....	31 miles
Bituminous surfacing.....	205 miles
Oil-treated gravel.....	250 miles
Gravel surfacing.....	1,662 miles
Graded dirt roads.....	717 miles
Light gravel township roads.....	710 miles

Maintaining this network of secondary roads during the bitter northern winters requires 107 units of snow-removal

equipment and costs approximately \$250,000 each season.

Opening the system of county farm-to-market and pit-to-dock roads in St. Louis County in wartime has become a task of increased importance to G. W. Deibler, St. Louis County Highway Engineer, who last July had placed the finishing touches on his program of snow removal for this winter.

The average snowfall in St. Louis County is about 50 inches. The maximum fall was recorded during the winter of 1937-38 when 88 inches of snow fell. Regardless of the amount of the snow in the war winter of 1943-44, County Highway Engineer Deibler had pledged that all important county roads would be open to essential users on a 24-hour-a-day basis.

"Only a few years ago," commented Engineer Deibler, "it was considered reasonable to open a few miles of rural highways when and if convenient. But even before the war, the attitude of the public had changed. They demanded that practically all highways be plowed regardless of the snowfall, equipment required, or expense involved. Of course, during this wartime winter, snow removal on the county roads in this vital area is essential."

Although the St. Louis County highway fund for construction and maintenance of highways is usually well in excess of \$1,000,000 a year, snow removal annually requires a large percentage. At times more than 50 per cent of the total maintenance fund has been required for snow removal and seldom does the cost of winter maintenance fall below \$225,000. During the early spring days, as a bright, warm sun melts away the last snow from the highways, the County Engineer cannot help ruefully contemplating the construction that might have been undertaken with the hundreds of



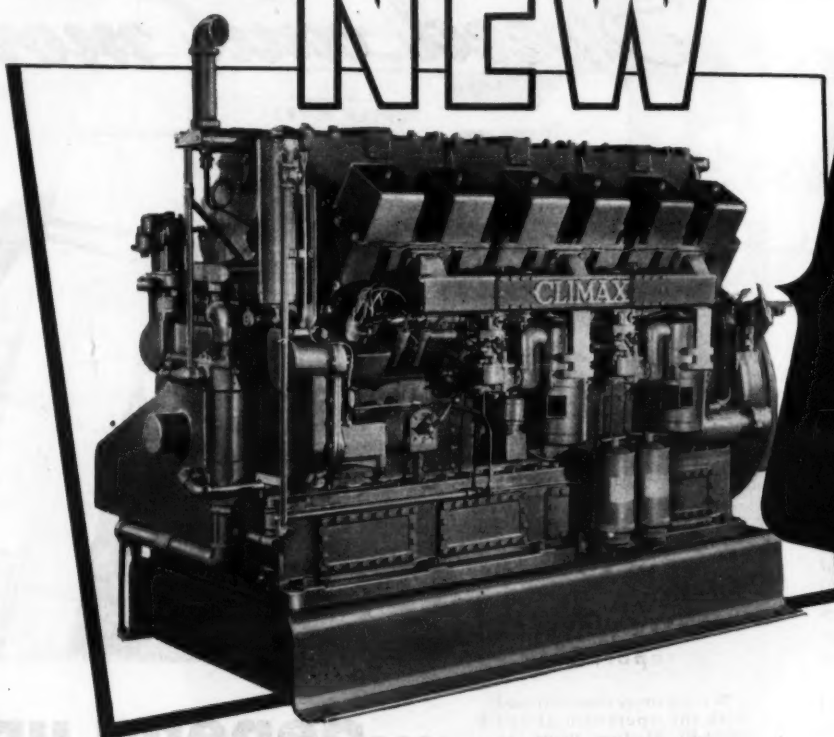
A truck with V-plow and wings widening out on a slushy gravel road in St. Louis County after a spring thaw.

thousands of dollars just expended for clearing the highways of snow and ice.

Despite the cost, however, St. Louis County has met the requirements each year and again this season prepared to meet the blustering challenge of winter. The county-owned snow-removal equipment is adequate for the difficult winter assignment and last summer was checked

(Continued on page 50)

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95" LONG
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This compact V type power plant provides that smooth flow of abundant power possible only from a 12 cylinder engine. Because it generates power from natural gas, butane, propane, distillate, gasoline or other mixtures, the V 12 possesses an operating flexibility unknown in single fuel prime movers. It starts as easily as an automobile engine and can be operated over a wide speed range without encountering criticals.

The engine is simply designed and easy to operate. No specially trained mechanics are needed for either maintenance or repairs.

SEND for Climax Engine Bulletin No. S 329, which contains specifications, performance curves, drawings and dimensions and complete description of the V 12.



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In the Production of
War Material"

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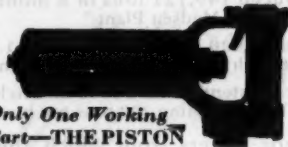
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Climax V 12 is a heavy duty engine for all stationary power applications.



The new CAA six-way air-line filter with automatic water trap.

New Air Filter Has Automatic Water Trap

A new compressed-air-line filter, featuring a new self-dumping trap which automatically empties the water filtered out of the lines, has been announced by Filters, Inc., of Glendale, Calif. The improved CCA (Controlled Compressed Air) filter is also equipped with two additional outlets, making a total of six in the manifold, which permit the use of a larger number of filter lines for serving air-tool operations at a given point. The outlets are $\frac{3}{8}$ -inch to accommodate snap-on hose connections. These filters are designed to prevent dust, rust scale, oil, and water from entering valuable, and in many cases irreplaceable, air tools, and thus to prolong the life and increase the efficiency of pneumatic equipment.

The closed float of the CCA self-dumping water trap assures opening and closing of the discharge valve, and quick disposal of water. Interior parts are heavily plated to reduce rusting to a minimum, and the trap is easily serviced. It is standard equipment on all CCA filters having 1-inch or larger pipe connections, but smaller filters may also be so equipped if requested.

Further information about this product may be secured from the manufacturer, Filters, Inc., P. O. Box 471, Glendale, Calif., which reports that orders can be filled immediately from stock.

Two Controls Added To G-E Arc Welders

Improvements in the G-E line of direct-current single-operator arc welders, Type WD-30 series, have been announced by the Electric Welding Division of the General Electric Co., Schenectady, N. Y. These welders are now equipped with two new control dials and a redesigned driving motor. The control dials permit the welding current to be pre-set without the aid of a voltmeter, and the driving motor is designed for exceptional resistance to the weather when the welding machine is operated outdoors.

One of the control dials, large in size and conveniently located, is calibrated in terms of electrode size. The operator sets this dial to correspond to the size of the electrode being used. The

other dial indicates the range of welding current available for use under these conditions. The operator pre-sets the welding current merely by rotating a pointer to whatever amperage he wishes to use. Easily read calibrations facilitate the quick and accurate setting of both dials.

The driving motor, essentially the same as that previously used with these welders, is equipped with heavier insulation and has special weather-protective features. Enlarged intake openings for ventilating air keep the air velocity low enough to prevent rain and snow from being drawn in, while a large baffle back of the openings prevents water from splashing into the motor. The insulation of the motor windings is very heavy, and accelerated life tests show that this new insulation is far more resistant to deterioration from salt spray than the insulation previously furnished.

Complete information regarding these direct-current arc welders may be secured from the Electric Welding Division by mentioning this descriptive text.

CED Reports for 1943

Over 24,000 business men, members of the Committee for Economic Development, in communities in every state, are now working toward the goal of greatly expanded peacetime production and post-war employment, according to an announcement made recently by Paul G. Hoffman, President of The Studebaker Corp. and Chairman of the Board of Trustees of the Committee, in a summary of CED's 1943 work.

The report states that, for the first time in American history, business men have voluntarily banded together to avert a threatened disaster. CED committees are now working actively with approximately 48,000 industrial firms and corporations whose total output in 1939 represented \$41,500,000,000, about 73 per cent of America's total factory output, and nearly 6,000,000 jobs or 60 per cent of its factory employment.

"The local CED committees have concentrated first on stimulating industrial firms to plan for higher peacetime pro-

duction than ever before. Higher peacetime industrial production means more jobs. This in turn means more purchasing power for the products of business and agriculture", Mr. Hoffman said.

The Committee for Economic Development is a non-governmental, independent organization of business men who have the common goal of helping to achieve a post-war national production level 30 to 45 per cent higher than our banner peacetime year of 1940. They are asking each industrial employer to supply confidential figures on how many people he employed in 1940 compared with the present, and to calculate how many he will need in the first twelve months of peace. Mr. Hoffman stated that the figures received show that many firms have set their post-war production, and consequently employment, goals on a substantially higher level than 1940.

In 1941 Missouri constructed 1,030 miles of roads, in 1942 they built 54 miles, and in 1943 only 45 miles. There is a post-war market for you!

What if this 15 Billion Dollar Baby WERE DROPPED IN YOUR LAP?

The general location of routes of the recommended interregional highway system. Total length of the system is 33,920 miles.

RESIDENT ROOSEVELT recently proposed the nationwide network of super-highways shown above. This plan would take 10 to 20 years to complete, would cost an estimated 750 million dollars annually. While this complete proposal may never reach the blueprint stage, parts of it and other impressive postwar projects now under consideration in both the United States and Canada most certainly will.

What if one or several of these "billion dollar babies" starts dropping your way? Will you be able to handle a share of this business more economically, efficiently and profitably than your competitors?

The answer may depend on how well you plan your postwar organization and equipment set-up. And that's where your Lorain distributor can help. He keeps fully informed on new equipment developments. Chances are he'll be able to pass along plenty of money-making, time-saving advice just when you need it most. So, if you haven't done so already, get acquainted with your nearby Lorain distributor now.

THE THEW SHOVEL COMPANY • Lorain, Ohio

It's easier to lift, lower, push or pull the Simplex Way!

Simplex
LEVER SCREW HYDRAULIC JACKS

for every construction purpose
Awarded the Gold Medal for Safety
Ask for Catalog 44
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SHOVELS

CRANES • DRAGLINES • MOTO-CRANES

Motor-Driven Plant For Indiana Hot-Mix

(Continued from page 7)

spread the material in the widened sections, while one shovel man worked with one of the rakers to carry back material to make up the center joint.

To guide the Adnun, a set of form pins were driven in the shoulder and an offset arm kept along the line of pins during the first run. When the second run was being made to complete the surfacing, yellow chalk marks were made on the initial lane and the offset guide run along them.

The breakdown rolling of the hot-mix was done by a Galion 6-ton tandem roller, followed by finish rolling by a Buffalo-Springfield 10-ton 3-wheel roller. A hand sweeper was kept busy throughout the work, removing dirt or excess binder material from the pavement. This man aided greatly in maintaining the neatness of the job.

This outfit averaged about 500 tons of hot-mix spread in 10 hours on this job, although the same outfit has done 600 tons on shorter hauls and with a larger fleet of trucks. Due to a scarcity of trucks in the area, only nine were available for the long hauls and these carried three or four 2,000-pound batches per load.

The Asphalt Plant

The contractor set up a Cummert portable asphalt plant in the yard of an old pottery on a railroad spur in Huntingburg. The spur track was below the level of the yard in which the Northwest crane was operating. This was a great advantage because the operator was thus above the level of the cars and could see into them readily. This crane with a 3/4-yard clamshell bucket unloaded all of the aggregate to stockpiles or to the feeder for the cold elevator. The cars were moved along the spur by an old Caterpillar Fifty tractor.

Asphalt was brought in by tank cars on another spur track and delivered by a Kinney asphalt pump driven by a Fairbanks steam pump to the 26,000 and 16,000-gallon heated storage tanks. A 16,000-gallon fuel-oil tank was set up adjacent to the plant for storage of the oil for the large burner in the drier. A horizontal boiler provided the steam for heating the jacketed asphalt lines, for operating the asphalt delivery pump, and the duplicate installation for circulating the asphalt through the loop between the asphalt storage tank and the weigh box. This boiler also supplied steam for operating the gates beneath the



C. & E. M. Photo
The electrically driven Cummert asphalt plant set up in Huntingburg, Ind., to furnish binder for a 7.5-mile resurfacing contract of the Indiana Asphalt & Paving Co.

pugmill.

Only one man was required to handle the batching and the dumping of the mix. The plant is equipped with two Fairbanks springless scales, one on the aggregate and one for the asphalt weigh box. The specified time of mix for the

plant was 1 1/2 minutes for the aggregate, with an average of 5 per cent of asphalt.

The plant is driven entirely by General Electric motors, with a separate 45-hp motor for driving the Buffalo Forge Co. blower on the drier through a V-belt. Another 45-hp motor turns the drier, a

60-hp motor is used on the mixer, a 7-hp motor on the screen, a 5-hp motor on the hot elevator, and a 1 1/2-hp motor drives the fuel-oil pump.

Personnel

The contract for widening and resurfacing 7.5 miles of Indiana State Road 45 between Dale and Huntingburg was awarded to the Indiana Asphalt Paving Co., of Indianapolis, Ind., for whom George Brillart, Vice President, acted as Superintendent. The contract was awarded by the State Highway Commission of Indiana, S. C. Hadden, Chairman. Robert M. Weikert was Project Engineer. This piece of salvage work was done as a maintenance operation, under the supervision of Norman F. Schafer, Superintendent of Maintenance.

This is largely an air and amphibious war, a type of warfare that calls for less earth-moving and construction work. Victory seems to favor the side with the greater ability to move dirt.

Major-General Eugene Reybold

HOW ABOUT Availability OF CLEVELAND ROCK DRILLS?

Of course, you are well acquainted with the excellent performance and durability of Cleveland Rock Drills. Our purpose here is to inform you of the prompt delivery we can make on this equipment.

◀ **MODEL H111**—Leader in the 55-pound class for soft, medium, or hard rock. With AA-1 priority, shipment will be made within a week of receipt of order.

MODEL H10—The favorite in the 45-pound class. Despite the popularity of this drill, we are still in position to accept orders carrying AA-1 priority.

◀ **MODEL H66**—The light drill with the big wallop. With AA-1 priority, we can ship reasonable numbers of this good machine within a week of receipt of order.

Rock drill users, that's the situation on Cleveland hand-held drills. On spare parts we make immediate shipment. Be assured that your requirements will always have our best attention.

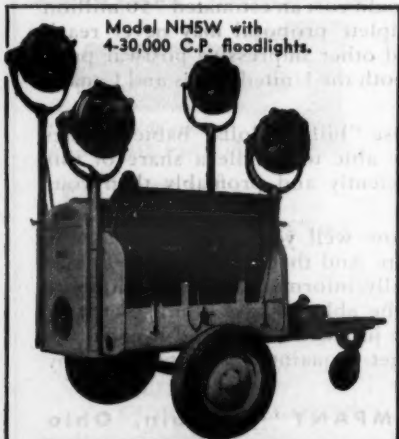
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LIGHT—Where you want it—when you want it.
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Division of The Cleveland Pneumatic Tool Company

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Discussion of Need For Post-War Plans

ARBA Meeting Covered Many Phases of Post-War Planning and Problems; Sessions Well Attended

THE 900 highway engineers, contractors, and manufacturers of construction equipment who attended the Forty-First Annual Meeting and Post-War Highway Conference of the American Road Builders' Association for three days at the Edgewater Beach Hotel, Chicago, last month devoted four general sessions, five separate concurrent sessions, and four luncheon or dinner meetings to serious and constructive discussions of post-war problems. These covered the ARBA plan for stimulating needed construction of highways in the post-war years, the plans of governmental agencies and the Congress for the disposal of used and new construction equipment belonging to the armed forces, and the plans of business, manufacturers, contractors, and highway officials for the best use of their collective minds to prevent a drop of the national income to a figure that might result in unemployment.

Seldom in the history of the Association has there been such a uniformly high attendance at all sessions, indicating the determination with which those present look upon the problems facing them. At the opening session, which dispensed with the usual banalities of being welcomed to the state and city by representatives of the men invited to express platitudinous sentiments, the conference got right down to business with a straight-from-the-shoulder paper by Col. William N. Carey, Chief Engineer, Federal Works Agency, which pointed out that as yet there is no "shelf of public works", and which is published in abstract on page 35 of this issue. Carl W. Brown, President of the Association and Chief Engineer of the Missouri State Highway Department, presented his report of the activities of the Association for the year.

At a luncheon meeting immediately following, R. G. LeTourneau, President, R. G. LeTourneau, Inc., discussed "Roads of the Future", stressing the tremendous strides in dirt-moving methods in recent years and in prospect, as well as the contribution of pneumatic tires to the advance of the construction industry.

At the second, or afternoon, session on February 1, H. E. Hiltz, Deputy Commissioner, Public Roads Administration, discussed Federal Aid and its future in relation to the realization of the Inter-regional Highway System, which is outlined on page 2 of this issue. Samuel C. Hadden, President of the American Association of State Highway Officials and Chairman of the State Highway Commission of Indiana, reported on the activities of that Association in furtherance of Federal Aid and the expected activities of the individual states. The evening of that day was devoted to a general get-together of the Old Timers, those who have been members of the American Road Builders' Association for twenty-five or more years. This year younger members were invited to attend in order to hear George L. Earle, son of Horatio S. Earle, founder of the ARBA, speak on the early days of the organization.

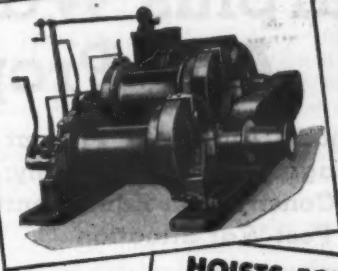
The session of February 2 started with a discussion by Randolph Jennings, Chairman of the Special House Committee Investigating Synthetic Fuels and a member of the House Roads Committee, of activities in the research field to secure additional sources of fuels for combustion engines. Commander Patrick H. Winston, USNR, attached to the Selective Service System, discussed unem-

ployment in the immediate post-war period, stating that demobilization will not be a hasty and pot-luck affair but will be done with care and deliberation. Harold D. Smith, Director, Bureau of the Budget, spoke on "Public Works and the National Welfare". The closing address of the session was given by Ralph W. Carney, Vice President and Sales Manager, Coleman Lamp & Stove Co., Wichita, Kans., who made an impassioned plea for more realization that the war is not over, that it still can be lost, and contrasting the 24-hour-a-day job of the men in the armed forces overseas with the complacent 8-hour day with time and a half and double time for overtime demanded by most labor unions and enforced by strikes which have delayed the production of needed war material. Copies of Mr. Carney's talk may be secured by writing to him at the address given and will be found stirring and stimulating. Half-hearted bond buyers and slackers may find less of interest to them, though it might possibly

(Concluded on page 55)

Hoists to Fit the Job

Lidgerwood hoists have earned a 70-year reputation for dependability and efficiency on the job. There's a Lidgerwood gasoline, steam, electric or Diesel hoist to fit every construction need. When you need a hoist inquire first of LIDGERWOOD.



HOISTS FOR:
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GOES THE JEEP "ONE BETTER"
WITH ALL-WHEEL DRIVE *plus*
ALL-WHEEL STEER

IN ARMY VEHICLES, it's the All-Wheel Drive Jeep...favorite of servicemen...hero of a thousand exploits...covered for post-war use by a million farmers.

IN POWER GRADERS, it's the "99-M"...performance leader since 1937, with All-Wheel Drive for maximum traction, PLUS All-Wheel Steer for maximum maneuverability.

AUSTIN-WESTERN COMPANY, AURORA, ILLINOIS



**BUY MORE
WAR BONDS**

Surplus War Stocks And Proper Disposal

Methods Aimed to Prevent Damaging National Economy; The Construction Equipment Post-War Situation

✦ RUMORS, discussions and "crepe-hanger" prophecies have befogged the picture of post-war disposal of construction equipment and the effect of present government policies and future policies on the construction machinery industry. Much of this lack of knowledge was overcome by a very outspoken panel discussion at the American Road Builders' Association Post-War Conference in Chicago, February 1-3, 1944. Representatives of the U.S. Engineer Corps, Federal and state government departments, manufacturers, distributors and contractors traded ideas, answered questions, both prepared and spontaneous, and generally clarified the outlook of the large audience.

This article is based on the panel discussions, statements made by Congressmen at other sessions, and a survey conducted by the Manufacturers' Division to cast light on the availability of new equipment after the war and on the desires of state highway departments as expressed in a resolution passed by the maintenance and equipment engineers at the Mississippi Valley Conference of State Highway Officials which met just prior to the ARBA meeting in Chicago.

How Much Surplus Equipment?

Before we get too worried about how we are going to dispose of the new and used government-owned surplus construction equipment after this war, we had better determine whether the conditions are going to be similar to those after World War I. Then a great volume of used equipment was dumped promiscuously on the state and county highway departments, whether they wanted it or not, and frequently it turned out to be articles for which they had no use, such as saddles, sheaves that never fitted any piece of equipment, and trucks that were so expensive to operate and maintain that they were more costly than the purchase of new trucks of smaller sizes.

Lt. Col. Enoch R. Needles, Chief, Redistribution and Salvage Branch, Supply Division, Military Supply, U. S. Corps of Engineers, stated that in the United States there are some 100,000 pieces of construction equipment accumulated by the Corps of Engineers for construction and maintenance purposes, and the Engineers are just as anxious as the balance of the industry to dispose of all surplus equipment properly at the end of the war. He felt that all equipment in foreign countries will be left there because its use by our forces has been a great sales argument and it will improve the foreign market for American construction equipment. A total of 80,000 pieces of equipment has been shifted to other uses and places after its original use by contractors or in the Army equipment pool for the construction of military projects in this country. Some of this

went out of the country to the Alaska Highway and some of that has come back for reconditioning as there are at least three places where such equipment can be used. The older and lighter equipment will be used for maintenance of military posts, while the better and heavier equipment will be used for troop training and will be sent overseas.

In response to questions, Colonel Needles stated that overseas equipment will not very likely be in condition to be brought back, and that the scrap that is being returned from foreign battlefields is not construction equipment returned for overhaul but is going into the steel furnaces of the country.

As was brought out by Fred Salditt of Harnischfeger Corp. in recent discussions, there will be a large volume of

new construction equipment in process of assembly and shipment or storage for overseas use when the war ends. He has asked that this not be turned into trade channels to disrupt the national economy (C. & E. M., February, 1944, pg. 4). This will amount to a large volume, even as much as 6,000 cranes, shovels and draglines, which could badly cripple the sales of newly manufactured equipment for civilian uses if thrown on

the open market.

According to H. O. Penn, President, H. O. Penn Machinery Co., New York, around 332,000 pieces of used construction equipment will be in the hands of contractors and highway departments for use after the war. He points out, however, that most of this was manufactured prior to 1930 and hence is not to be considered as in competition with new

(Continued on page 47)

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to Wartime America
DAVENPORT-FRINK
SNO-PLOWS
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When we
leave the
WARPATH-

GET OFF TO
A GOOD START

SHOVELS
DRAGLINES
CRANES

Tomorrow when Victory is ours and we leave the warpath you will be needing new shovels, cranes and draglines for the big jobs that are now being held in abeyance. When that time comes LIMA will be ready to give your excavator and crane requirements undivided attention.

Faster, safer and more efficient LIMA Shovels, Cranes and Draglines will be available through the use of new material, new methods of manufacture and experiences gained from war time service. The many new advantages to be offered by LIMA will help you make more profit through greater output on the big jobs coming up.

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Dependable Products Since 1873
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At Carrollton, N. Y., Irving subway grating has been installed at the bottom of a slip-py sloping highway leading to an Erie RR crossing in order to trap dirt, ice, stones and other debris, loosened by winter conditions, in the culvert below the grating and thus eliminate the need for maintenance crews to clear the track. The removable grating also permits quick and easy cleaning of the culvert.

Full-Circulating Bar Fits Any Distributor

The Cartwright hot spray bar, made by the Cartwright Asphalt Equipment Co., was especially designed to handle heavy bituminous liquids, and can be applied to any make of bituminous distributor. In this bar, the hot material is circulated under pressure the full length of the bar, end to end. An inner pipe provides this circulation, heating up the entire bar with the nozzles closed, and keeping it hot when the nozzles are in use. Other features include instantaneous no-drip shut-off, the elimination of fat and lean streaks by the scientific angle and spacing of the orifices in the nozzles, and the impact-proof swinging end sections equipped with patented unions which permit them to swing out of the way upon striking an obstruction.

The Cartwright bar is made in three sections, the two end sections being swung up out of the way when not needed, without affecting circulation. The bar's full width is 10 feet, while the center section alone will shoot a width of 7 feet. Extensions can be added to either or both ends to provide up to 24 feet or more coverage. The center section of the bar is made of 3-inch wrought-steel pipe with a 1½-inch inner pipe and 2-inch connections. The end sections are 2½-inch-outside and 1½-inch-inside diameter. The nozzles on 4-inch centers all have orifices of two different sizes, with valves of corrosion-resistant material machined and ground for snug fit.

The Cartwright Asphalt Equipment Co., which recently moved from Independence, Kansas, to Galion, Ohio, announces that it is in a position to make reasonably prompt delivery on these hot spray bars. Further information, including a copy of Bulletin 843 describ-

ing the Cartwright bar and showing units at work on airport and highway

construction and maintenance, may be secured by interested contractors and state and county highway engineers direct from the manufacturer by mentioning this item. Cartwright engineers have recently prepared a "Chart for Good Distribution", copies of which are also available upon request.

Streamlined Clamp For Hose Fittings

The new Punch-Lok hose clamp is a mechanical device for connecting various kinds of male and female fittings, special nipples, menders, or ordinary pipe to a hose. All hose, from the modern high-pressure wire-woven and braided hose used in the control of hydraulic machines such as dirt-moving scrapers, bulldozers, and snow plows, acetylene and pneumatic-tool hose, electric welding cable, sand-blast hose, or any kind of flexible coupling between rigid pipe lines or fittings for air, steam, bituminous materials, gasoline and oil,

down to ordinary air and water hose may be fitted with this streamlined clamp.

The Punch-Lok hose clamp and fittings have been engineered to make application possible without injury to the hose itself, and the manufacturer states that, once the clamp has been locked, neither vibration nor rough handling can loosen it. In making the connection, a broad flat high-tensile-strength galvanized-steel band is double-wrapped around the joint. After tensioning with a pull of 1,000 pounds within the Loking-Tool, the ends are securely locked together under tension without loss of tension within the flat pressed-steel clip, and the excess band cut off flush with the clip so that the entire joint is streamlined for safety.

An 8-page folder, describing and illustrating the Punch-Lok clamp, Loking-Tool and the procedure for making the connection, may be secured by interested contractors and state and county highway engineers from Punch-Lok Co., 321 No. Justine St., Chicago 7, Ill.

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DIRT
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WAR!**

**BUY
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THIS is a dirt-moving war... a tractor war. Already the history of World War II is brimful of heroic jobs done by crawler tractors, equipped with bullgraders, bulldozers, scrapers, shovels, winches, and a variety of other dirt-moving equipment.

As a two-star general of the Army Engineers puts it: "Victory seems to favor the side with the greatest ability to move dirt."

Munda... Rendova... the Solomons... Kiska... Sicily... Salerno... everywhere our fighting forces go, you'll find these armored giants building roads, smoothing shell-torn landing fields, pulling heavy guns, handling aircraft bombs.

The Armed Forces have first call on International Trac-

TracTors today. That's why so few new ones are available for civilian use. The new TracTracTors you need so much today, to replace badly worn equipment, are more urgently needed on the fighting fronts.

Many of your old Internationals have a lot of work-hours left in them. Keep those tractors well serviced. Work closely with your International Industrial dealer. He has the skilled service men, the well-equipped shop, and the stock of International Parts to help keep your TracTracTors plugging on the home front, backing up the military TracTracTors on the battle front.

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160 North Michigan Avenue Chicago 1, Illinois



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STANDING ROOM ONLY
FOR DURATION**

Beebe Bros. All-Steel Hand Hoists carry the highest resale value of any piece of equipment in the world. If you have one not in use, sell it. Many more than are available are urgently needed in the win-the-war program. Thanks.

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INTERNATIONAL POWER

Interregional System To Serve Most People

(Continued from page 11)

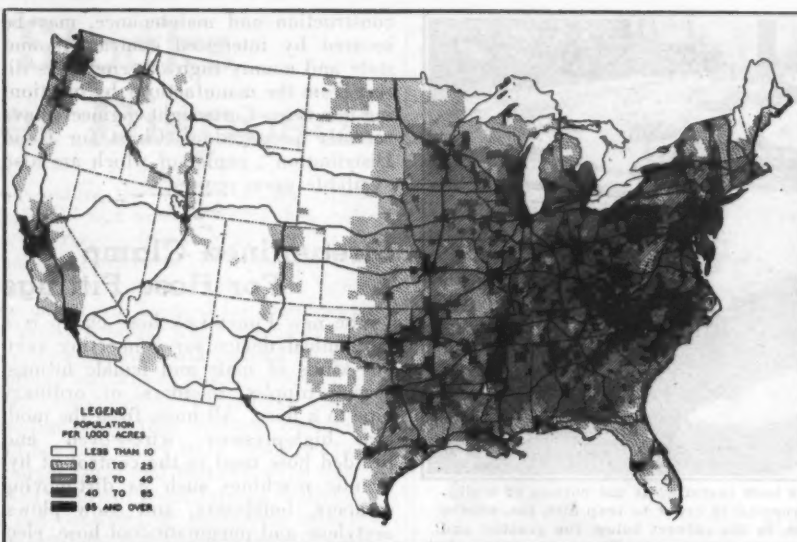
found that the counties traversed account for 43.3 per cent of the total value of all farm products sold or traded in the nation as a whole. Per county, the average value of marketed products in the counties traversed is 46 per cent higher than in the remaining more numerous counties.

Although, in comparison with the other systems investigated, the recommended system does not afford so pronounced an advantage in proximity of service to agricultural production as in service to manufacturing industry, it does closely approach the greatest service to agriculture obtained by any of the systems. This advantage reaches a maximum in the 48,300-mile system, but is nearly as great in the recommended system.

Motor-Vehicle Ownership. Cities of 10,000 or more population located directly on the recommended system were the places of ownership in 1941 of 13,932,788 registered motor vehicles. Vehicles registered in the same year by other owners resident in counties traversed by the system numbered 8,180,819. The total of all motor vehicles registered by owners resident in counties traversed by the system amounted, therefore, to 22,113,607. This is 68.7 per cent of the total 1941 registration of motor vehicles.

In counties traversed by the system the density of motor-vehicle ownership in 1941 was 18.7 per square mile and one for each 3.9 persons. In all other counties the density was 5.5 per square mile and one for each 4.5 persons. These facts give further evidence of the appropriate choice of routes included in the system.

Post-War Labor Release. In his letter to the Federal Works Administrator, the President indicated his expectation that, in the construction of an Interregional Highway System, it would be possible to utilize some of the man-power and in-



The recommended Interregional System in relation to the density of rural population distribution by counties in the United States.

dustrial capacity available at the close of the war. If such utilization is to be

encouraged, a close relation is desirable between the location of the interregional routes and the principal places at which the release of war-occupied labor is to be expected. Such correspondence in location would be advantageous, notwithstanding that the labor requirements and dispersion of war industries have caused an extensive migration of workers from their former communities to the places where they are now employed and where they will lose that employment when the war ends. The return of a peacetime economy may necessitate another and possibly reverse migration or at least a redistribution of the available worker population. But it will be expedient to avoid, if possible, a precipitate rush from the war-industry centers. At least temporary employment for considerable numbers of workers who will be released should be provided in the general vicinity of their present jobs.

The routes of the recommended Interregional System, particularly those that

(Continued on next page)

Keep Your Lubricants Clean!

Dirt and grit and similar abrasives which are allowed to creep into the lubricant to grind and damage your equipment, are Fifth Columnists.

They are often the causes of failures for which something else is unjustly blamed. Guard your vitally important excavator against such preventable operating interruptions. Keep it working for victory.

THESE SIMPLE PRECAUTIONS WILL INSURE CLEAN LUBRICANTS:

1. Be sure oil and grease comes to you clean.
2. Keep lubricants covered and stored neatly in a clean place.
3. Drain oil enclosures when hot so the draining oil carries off the sludge.
4. Keep funnels, plugs and oil spouts clean. Wipe off oil can covers before removing.
5. Keep empty containers that are to be refilled clean and tightly covered.
6. Clean enclosure covers before removing for inspection.
7. Clean outside of grease gun before using.
8. Clean fittings so that grit is not forced in with grease.
9. Be sure gun is thoroughly cleaned before changing type of grease.
10. Keep your machine clean always.

Bucyrus-Eries are the finest excavators that modern engineering can build. Good lubrication regularly, carefully and cleanly applied will protect their easy, smooth, high speed operation in the vital tasks they are performing in winning the war.

"CLEVELANDS"

Forerunners of All Full Crawler Ditchers
ASSURE MAXIMUM RETURN ON
YOUR INVESTMENT



Their modern, job proven design puts more dirt off the conveyor. Their super-quality construction makes them keep doing that. From every angle — power, speed, durability — ease of handling and portability — "CLEVELANDS" have proven themselves, on the job, performers of a superior type.

PRODUCTS. — Ditchers, Wheel and Ladder-Type (in several models) — Side Boom Backfillers, Pipe Cranes, etc.

THE CLEVELAND TRENCHER COMPANY
"Pioneer of the Small Trencher"

Bucyrus-Erie

SOUTH MILWAUKEE, WISCONSIN, U. S. A.

Traffic Studies Aid In Selecting Routes

(Continued from preceding page)

will stand at the close of the war in most immediate need of major improvement, are well located to supply construction employment. Remarkable correlation exists between the location of routes of the recommended system and the area of greatest wartime employment increase. As it is to be expected that workers released by the cessation of war production will generally be most numerous where employment has increased most during the war, the Committee's study gives convincing evidence of the fortunate location of the recommended interregional route for the post-war absorption of workers in a highway construction program. This result is especially interesting in view of the fact that the route locations were determined as those best fitted to meet the most important highway traffic requirements.

The Strategic Network. War traffic on the highways—that to, from, and between the points of particular war-activity concentration and between these points and the ports of embarkation—is moving in the longer distances over roads conditioned for normal peacetime travel, and mainly over routes of the strategic-highway network.

Within the limitations of its total extent, the recommended Interregional System conforms closely to this strategic network. As we now clearly see, the significance of the strategic network in such a total war as that in which the nation is at present engaged must be interpreted in terms of the carefully precise descriptive title applied to it by the War Department. It consists of not all but only the principal traffic routes of military importance. In the present war a very large part of the whole highway system of the nation is bearing a substantial share of the burden of war, but we are finding that in general the routes of the strategic network were well chosen as the principal ones.

Routes of Heaviest Traffic. Connecting the largest cities of the country and the larger cities of each geographic region, passing en route through the most populous belts of rural and small-town population, joining centers in which a high percentage of the nation's manufacturing activity is concentrated, traversing generally the most productive agricultural lands, and tapping the centers and areas of densest motor-vehicle ownership, it is naturally to be expected that the recommended system will accord well with the heaviest lines of highway traffic flow and serve in the aggregate a share of the total highway movement far in excess of its proportion of the total highway mileage.

This expectation is fully borne out by a traffic study made by the Committee. The 1940 traffic on existing roads closely conforming to the recommended system was compared with the traffic on other roads included in the numbered U. S. system. Of the 29,450 miles of rural roads approximating the location of rural sections of the recommended system, traffic counts made by the state

highway planning surveys in 1941 show that 6,056 miles, or 20.6 per cent of the total, carried traffic that year averaging less than 1,000 vehicles daily. On 9,576 miles, or 32.5 per cent, the daily traffic averaged between 1,000 and 2,000 vehicles. A total of 6,104 miles, or 20.7 per cent, served traffic averaging between 2,000 and 3,000 vehicles daily; 7,182 miles, or 24.4 per cent, carried traffic between 3,000 and 10,000 vehicles per day; and only 532 miles, or less than 2 per cent of the total, carried an average daily traffic of 10,000 or more vehicles. The average traffic carried by all rural roads conforming closely to the system was 2,660 vehicles daily, and the total traffic movement, 78,208,300 vehicle-miles. The latter was 16.79 per cent of the 465,753,000 daily vehicle-miles served by all rural roads in 1941.

No similarly exact data are available to show the traffic served by existing city streets approximating the location of urban sections of the system, and were such facts available, they would be of little significance as a basis for an esti-

mate of the traffic that would be served by more adequate facilities.

In estimating the probable traffic use of the recommended system, the Committee has made due allowance for shifts of existing traffic flow that would be induced by a preferential improvement of the recommended routes.

Topographic Features. The location of the recommended routes has been influenced in remarkably few places solely by the consideration of topography. A knowledge of the general topography of the country is nevertheless essential to a full appreciation of reasons for the varying sizes of interstices between the meshes of the system in different parts of the country and for the few places in which apparent indirection of the lines of the system would otherwise be unaccountable.

Maximum Utilization

To connect all communities classified as urban would require inclusion in the system of a large part of the nation's 3,000,000-mile rural road system. Such

a system would serve a very large part of the total highway traffic, but its average intensity of usage would be low by reason of the inclusion of much lightly traveled mileage. Obviously, it would be a much more extensive system than any that could properly be described as a major interregional system.

To go to the other extreme, it would be possible to select a system that would connect only, or mainly, the very largest cities of the country. It might be possible to accomplish this with a few transcontinental highways in each direction, though the connection would be indirect except between cities joined by the same route, and such a system would serve conveniently and fully only a very small part of the highway traffic of longer range. It would miss connection with many of the larger cities in its direct courses between the very largest cities. It would, therefore, traverse long distances, particularly in the West, where there would be little traffic to serve. Hence the average intensity of usage of

(Continued on page 28)



SOME HAISS EQUIPMENT USES

Loaders for putting material into trucks twice as fast as an equivalent general purpose tool.

Loaders for making shallow grading cuts—as in stripping top soil at an airport, or otherwise.

Clamshell Buckets for high-power excavating—and getting the work done regardless of handicaps.

Belt Conveyors for loading, stacking and labor saving handling at dockside, roofed-in warehouse, or out-in-the-open.

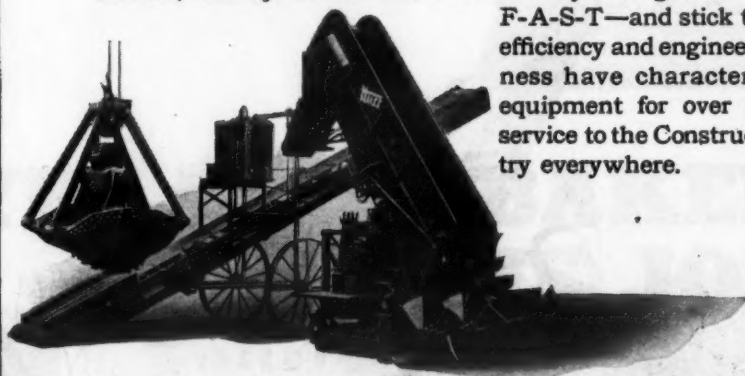
Portable Conveyors for placing concrete—eliminating plank walkways and wheel barrow labor.

HAISS-BUILT MEANS THE BEST IN DIGGING & LOADING EQUIPMENT

We're proud to have had Haiss equipment join our fighting forces throughout the world. As every war worker knows, there is a deep feeling of satisfaction and pride in having a hand in making a fighting tool for use against the enemy.

Where and how are Haiss units used? . . . It's a military secret, we can't discuss . . . but there is one thing about Haiss equipment that can be said because it's common knowledge: wherever our loaders, conveyors and buckets are they will get the work done

F-A-S-T—and stick to it. Design efficiency and engineered ruggedness have characterized Haiss equipment for over 50 years of service to the Construction industry everywhere.



GEORGE HAISS MANUFACTURING CO., INC., CANAL PLACE & E. 142nd ST., NEW YORK 51, N. Y.

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HEADQUARTERS for REPAIRS—any make

We will buy or trade in old Transits, Levels, Alidades, etc. Send instruments for valuation.

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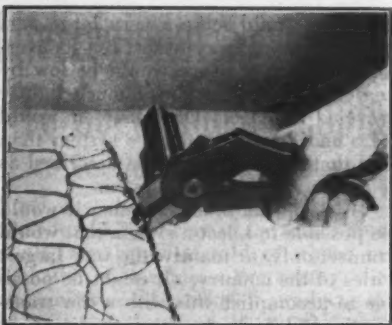
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HAISS



The new Bostitch plier for stapling wire mesh.

Hog-Ring Type Plier For Stapling Mesh

A magazine-fed stapling plier, originally developed for the use of the armed forces for attaching strips of wire netting and similar work, is now available in limited quantities to civilians engaged in essential work, according to an announcement by Bostitch, 115 Division St., East Greenwich, R. I.

This plier operates in the manner of the conventional hog-ring plier but wraps the staple around the work much faster, it is reported, as 60 to 70 rings may be applied with one loading. It is designed for one-hand operation, and its light weight, less than 2 pounds, makes for deft, rapid work. The narrow jaws permit its use in small spaces. The ring diameter is $\frac{1}{4}$ inch, ring overlap $\frac{1}{4}$ inch, and it takes a No. 16 wire.

Booklet Urges Planning Post-War Highways Now

Of the estimated 7,000,000 victorious soldiers who will be returning to civilian life and work at the end of the war, a certain proportion will be highway engineers and potential highway workers. In the interest of post-war planning for these people, and also in the interest of our worn and unrepaired highways, E. D. Etnyre & Co., Oregon, Ill., presents a pertinent booklet "Road-Building in the U. S."

It states that the "farm-to-market"

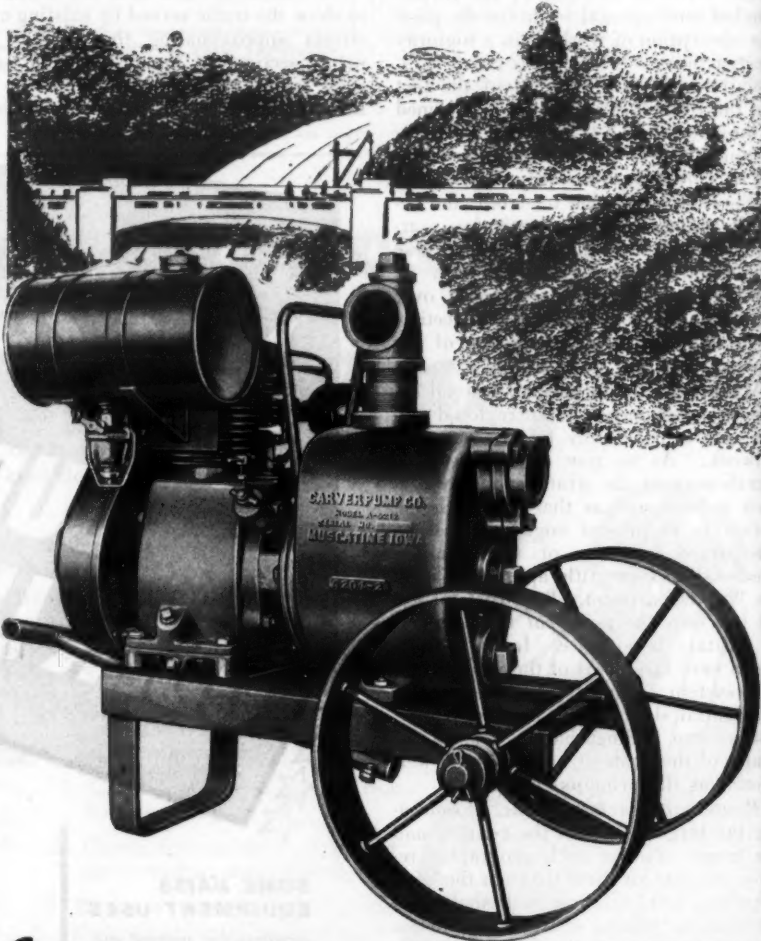
road will be one of the big problems in the post-war era and that its improvement should also receive early consideration. Of the 3,004,000 miles of rural roads in the United States, 940,000 are at present unimproved and 691,000 miles are graded and drained but unsurfaced, leaving a total of 1,631,000 miles of rural roads to be brought to a level of good driving efficiency.

The booklet further points to the investment of hundreds of millions of dollars in the 195,145 miles of highway built in the United States during the ten-year period of 1932 to 1941. This

investment will be jeopardized unless immediate steps are taken for necessary resurfacing and replacing as soon as the materials and man-power situation permits. Black-top treatment is recommended for this purpose, and the example is cited of the State Highway Department of Michigan which reconditioned worn-out highways at an estimated cost of about one-half that of new construction.

Copies of this booklet may be secured by interested highway officials upon application to E. D. Etnyre & Co., Oregon, Ill. Please mention CONTRACTORS AND ENGINEERS MONTHLY.

in the foreground of tomorrow's Construction Picture...



Carver...the Road Contractor's Pump

★ A poor dewatering pump is a "luxury" you can't afford on tomorrow's closely-bid jobs... You'll need a tough, rugged CARVER to handle the sandy, gritty water without clogging or excessive wear. CARVERS have shown savings as high as \$20,000 in dewatering costs on a single job.

When the time for your next job arrives, remember that you can add plenty to your profits with the hours and dollars a CARVER can save. Get the pump which is the new standard on road jobs—see your nearby CARVER distributor, or write us for a copy of the CARVER catalog NOW.

THE CARVER PUMP CO.
Muscatine, Iowa



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Buy A Share
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★

Lend a
HELPING HAND
with your
WAR
BONDS



In addition to their service on the fighting front with the army engineers, seabees and the RCAF, Insley Excavators are serving with equal efficiency and valor behind the lines, preparing vital supply and communications facilities under contract to many of the allied nations.

Such is the job Insley Excavators have done for Pan-American Airways... gouging airports out of the muck and mire and undergrowth of the jungle... working day and night in penetrating dust, steaming heat or freezing cold to provide the jumping off places for war-bound transports and bombers.

Here, as in the front lines, Insley's speed, stamina and ability to work efficiently in the tight spots have demonstrated their effectiveness as a force for shortening the Victory Road. And tomorrow—when they will again be available at home—Insley Excavators will prove to you their ability to save time and money on your jobs.



Black-Oxide Stripe On Concrete Highway

**Stabilization Under Heavy
Uniform Plain Section
Improves Fla. Primary Road;
Novel Cement Boxes Used**

(Photos on page 80)

FLORIDA'S progressive attitude toward the improvement of her heavily traveled main-line highways was further evidenced, during the summer of 1943, by the award of a contract to the Ivy H. Smith Co., of Jacksonville, for the construction of approximately 9 miles of concrete pavement, 26 feet wide and 8 inches thick, on a stabilized base. This job lies immediately south of Mt. Dora on U. S. 441, which carries much heavy traffic from north-central Florida to Tampa and Miami.

Base Stabilization

Portions of the old road had consisted of 3-inch sheet-asphalt pavement placed on a Florida lime-rock base, and it was decided to utilize this lime rock in the stabilization of the new subgrade. The old base was therefore removed and stockpiled during the grading operations, and later spread over the completed subgrade, including the shoulders, in a layer approximately 3 inches thick and incorporated with the underlying subgrade material, a moderately loose sand. Enough material was so mixed, by scarifying and blading with a Caterpillar No. 112 power grader, to give a stabilized base 12 inches thick, which was compacted by sheepfoot rollers hauled by tractors.

Fine Grade and Form Setting

Since the subgrade material was so easily handled, it was considered economical to cut the form trench by hand after it had been bladed approximately to grade by a Caterpillar No. 112 power grader. A crew of twenty-five men was used for this work, unloading and stringing forms, setting and moving grade strings, cutting bleeder ditches, and other miscellaneous operations. The actual setting of the Metaforms was done by four men, and the final aligning by three more after the base under the forms had been packed by a Jaeger-Lakewood form tamper. One man, using a bucket and mop, oiled the forms immediately ahead of the paver. The morning after, the forms were pulled and loaded on trucks by a crew of six men, who spent the remainder of the day in transferring pipe line for the water supply.

The grade was rolled by a 10-ton 3-wheel Ingram gasoline roller both before and after it had been cut to proper contour by a Model 4F R-B subgrader. The R-B machine was extended by the contractor for the 26-foot pavement width. In the easily handled material on this job, it was necessary to operate the subgrader an average of only five hours daily, so that it was possible for the operator to run the roller as well as the subgrader.

Batching Plant

The batching plant was erected at Zellwood, at the approximate center of the job. Rock, furnished by the Florida Crushed Stone Co., Brooksville, Fla., was unloaded to stockpiles and transferred to the Johnson steel bin by a Lorain 75D with a 45-foot boom and a 1 1/4-yard Haiss clamshell. A Lima Paymaster crane with a 45-foot boom and an Owen 3/4-yard clamshell was used for handling the sand, which was shipped from Lake Wales by the Diamond Sand Co. A Caterpillar D4 with a LaPlant-Choate bulldozer and an International TD-14 with a Bucyrus-Erie bulldozer were used for

trimming the stockpiles and moving the railroad cars. Two compartments of the 3-compartment bin were used for the one grade of rock, and the third for sand. The batch, containing 1,616 pounds of sand and 2,552 pounds of rock, dry weight, was accurately proportioned by weight. Lehigh cement, shipped in bulk-cement tank cars, was bottom-dumped into the receiving hopper, handled by screw conveyor to the elevator, and delivered to the Butler 400-barrel bulk-cement bin. Eight sacks, or 752 pounds, of cement were used per batch. A novel feature to reduce the loss of cement by wind action, as well as to eliminate the possibility of a major "run-through" loss of cement in the event the cut-off gate should jam in a partly opened position, was a bottom-



C. & E. M. Photo

The 35-foot boom of the new Rex 34-E paver left plenty of space for the steel men to use the frame, resting on the shoulder, for setting center joint.

less fabric tube extending from inside the weigh box to the top of the cement boxes on the batch trucks. Below the weigh-box gate were a pair of metal rolls, actuated by the gate mechanism, which clamped the bottom of the circular sack tightly except when cement was being discharged through it.

Each batch truck was equipped with two wood cement containers, one attached to the front end of the steel body and the other attached to the division gate which separated the two batches in the truck bed. A canvas cover over the top was rolled aside to permit loading

(Continued on page 48)



"With blade uplifted as a shield, Seabee Tassone barged through the undergrowth, and, then, as he reached the enemy pillbox he dropped the blade, scooping up earth on the Japs and burying them. Halfway over the hole he swerved his improvised tank around and then pulled away, leaving a flat, smooth area, and no trace of the Japs." (Courtesy Associated Press)

MAYBE YOUR BAKER DID THIS JOB!

If you have been temporarily denied a Baker Bulldozer, there is satisfaction in knowing that maybe your Baker made history at Guadalcanal!

THE BAKER MFG. CO.
585 Stanford Avenue
Springfield, Illinois



Unusual Sprig-Sodder Used for Airport Job

(Continued from page 9)

forms.

Concrete was delivered in truck mixers from a nearby commercial concrete plant, deposited on the subgrade from the mixers and spread and finished by hand, using a template shaped to coincide with the top of the gutter and resting on the side forms. The concrete was cured by a membrane curing compound.

Sprig Sodding

The area of shoulder between the runway edges and the concrete gutters was sprig-sodded with Bermuda grass by a novel method. A machine, designed and built by the contractor and known on the job as "the Rube Goldberg", was very effective in securing rapid and accurate placing of the sprig sodding.

The machine consisted of a frame, supported by a single axle on which were two wood-block metal-shod wheels, each 16 inches wide. On the front of the frame was mounted an 800-gallon water tank from which four rubber tubes extended to a point adjacent to the four plow points which were used to open the furrows for the planting of the sod sprigs. Behind the water tank was a slat-sided box approximately 14 feet long, 7 feet wide, and 4 feet deep, in which was carried a large supply of the sprigs of sod. Four canvas tubes reached from the grass rack to the planters' positions, which were plow seats swung under the frame in close proximity to the ground. Plowshares were set before and behind the seats. The entire machine was pulled by a Caterpillar RD7 tractor.

As the machine was pulled along the areas to be sprigged, the leading plowshares opened up shallow trenches, spaced 12 inches apart, immediately under the operators' seats. The four operators, taking sprigs of sod from the suspended canvas tubes which were kept filled by two women riding in the hay rack above them, placed the sprigs by hand in the shallow trenches which were at the same time watered by the tubes leading from the water tank. The following plows pushed the loose earth previously displaced back into the furrows and pressed it firmly around the freshly watered sprigs of sod. Except



C. & E. M. Photo

A close-up of the sprig-sodding machine, showing the body for Bermuda grass above and the canvas tubes carrying the sprigs to the women planters.

for the tractor driver the device was operated entirely by negro women.

Personnel

The improvements to the Jacksonville, Fla., Municipal Airport were performed by B. B. McCormick & Sons, general

contractor, of Jacksonville. The concrete-gutter work was done under a separate contract by Boyd & Goforth of Jacksonville. All work was under the direction of the Jacksonville District Office of the Corps of Engineers, with Captain S. M. Wall as Area Engineer and Captain A. H. Miller as Resident Engineer.

New Engine-Driven Arc Welding Unit

A new Shield-Arc engine-driven welder rated at 200 amperes, of lightweight rugged construction, and driven by an enclosed rubber-mounted engine of 29 hp, has been announced by the Lincoln Electric Co., Cleveland, Ohio. This new unit, supplied complete with base and canopy, has a current range of 40 to 250 amperes. Dual control of welding current is accomplished by adjustment of the series fields and generator speed. For metallic arc welding, with bare or coated electrodes, the new model

also supplies uniform welding current for carbon arc welding.

A generator control or "job selector" is designed to assure accuracy of open-circuit voltage and permit precise control of engine speed from 1,500 to 1,150 rpm for welding. In addition, this control may be used manually to reduce the engine speed to as low as 750 rpm whenever it is necessary to stop welding at intervals of a few minutes. This feature not only permits adjustment of the engine speed to fit the individual job, but also affords improved welding and keeps down fuel consumption and engine wear. The generator can produce rated current of 200 amperes when the job selector is set so that the machine operates at speeds as low as 1,200 rpm.

This new Lincoln Shield-Arc welder is 65½ inches long, overall, 24 inches wide and 41½ inches high, and weighs approximately 1,130 pounds. An illustrated bulletin, No. 312-C, containing more details on this unit, may be secured direct from the manufacturer. Just mention this item.

Try RING-FREE on your toughest jobs!



If you're "from Missouri", skip the soft spots . . . put Macmillan RING-FREE Motor Oil in the crankcase of the motorized equipment that is subject to your severest test! Here is what it does:

Macmillan RING-FREE Motor Oil removes carbon while the engine runs! The result is a cleaner, more thoroughly lubricated, sweeter running engine. And continued use of RING-FREE keeps carbon in check.

Furthermore, RING-FREE Motor Oil reduces friction fast! Internal engine friction is reduced to the extent that it's measurable in fuel savings as more power is delivered to the drive shaft. The fast penetrating quality, high film strength, high heat resistance and long cling to metal of Macmillan RING-FREE—contributing to reduction of friction—cuts down wear and repair. It pays to improve the performance and lengthen the life of all types of Diesel and gasoline engines with RING-FREE!

MACMILLAN PETROLEUM CORPORATION

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Cutting a secondary road is a tough job as every construction man knows. The equipment in the above photograph is lubricated by Macmillan RING-FREE, a tough Motor Oil for the toughest jobs.

RING-FREE "stays in there and takes punishment" . . . protects a hard-working engine with its ability to reduce friction fast. And Macmillan RING-FREE removes carbon while the engine runs! That helps many a piece of motorized equipment to better performance and longer life with less down time for repairs.

If you're having trouble with hard carbon, excessive wear, high fuel and oil consumption on your tough jobs, try Macmillan RING-FREE!

**MACMILLAN
RING-FREE
MOTOR OIL**

REDUCES WEAR BY REDUCING FRICTION

UNION

PILE HAMMERS

DOUBLE ACTING

Fast and Tough!

EST. 1900
Union Iron Works, Inc.
ELIZABETH, New Jersey



Four-yard trucks are loaded in slightly less than 2 minutes by an Athey W-1 MobilLoader, in this case handling bauxite ore. The MobilLoader has a 1½-yard bucket, digs its load at the front and discharges the material at the rear.

Cruces section there is a steep mountain trail which at present can be traversed only on horseback. In the Comitán-Tapachula section it will be necessary to blast a way over the towering Sierra Madre range, at an altitude of 6,500 feet.

Further construction will be on the Guadalajara-Nogales Highway, which is the most direct route from California and Arizona to Central America and Panama, and on the Mexico City-Tampico Highway which will give direct access to that important Gulf seaport.

New Type of Solder

A new type of fluxed wire solder, which contains flux in longitudinal grooves on the surface rather than in the conventional core, has just been placed on the market by the National Lead Co., 111 Broadway, New York City. According to the manufacturer, this new solder represents the first basic improvement in fluxed wire solder since

the introduction of this type of material a number of years ago.

The new material, known as Fluxrite, is said to insure thorough and complete fluxing and result in stronger and better solder joints, because the flux in the new product is outside rather than inside and therefore liquefies and flows onto the work before the solder melts. In addition to pre-fluxing, the new solder is also reported to provide an unbroken flow of flux. Interruptions in the flow sometimes occur with cored solders, due to gaps or voids in the flux core. Since the new solder has more than one flux-filled groove, there is a continuous flow at all times.

An additional advantage claimed for the new solder is based on the fact that since the flux is on the outside of the wire, it is always visible to the user and can be checked quickly and readily. Fluxrite comes in the same diameters as regular cored solder, and is available in two compositions designated as Red

Stripe and Green Stripe. These designations refer to the color of the flux which has been especially dyed for easy identification.

Five-Year Kotal Record

A new 16-page booklet on Kotal, the all-weather bonding process for combining bitumen with aggregates of all types, wet or dry, to produce paving mixes of toughness and durability, has recently been issued by the Kotal Co., 52 Vanderbilt Ave., New York 17, N. Y. Profusely illustrated with job photographs, this booklet presents a record of Kotal service during the past few years in the construction and repair of bituminous pavements, in all types of weather conditions.

Copies of this booklet, which also contains information on how to use Kotal for aggregate treatment, may be secured by interested contractors and engineers direct from the manufacturer.

Trends in Post-War Diesel-Engine Use

Two trends in wartime design and application will accelerate diesel-engine use after the war, John Dickson, Chief Engineer in charge of development, Detroit Diesel Engine Division of General Motors, told the annual Pacific Logging Congress recently.

First Mr. Dickson cited the rapid trend toward the higher-speed engines, and second, the equally rapid trend toward the use of smaller so-called high-speed diesels in multiple installations in place of single heavy large slow-speed diesels. Sounding a warning against expectation of radical innovations in diesel design in the immediate post-war period, Mr. Dickson disclosed some wartime discoveries that may ultimately lead to an entirely new position in the power world for the diesel type of engine. However, he prophesied an immediately far wider application of diesel power after the war than before, as a result of the war-proven developments. "I am convinced", Mr. Dickson said, "that post-war power will be the engines that have been produced and developed during the war and will not be radical innovations suddenly thrust on the users of engines as untried and undeveloped projects." These engines are of the high-speed type, in the production of which tremendous advances have been made. Wartime demand necessitated mass production methods, which should make for a relatively lower cost of the engine to the post-war purchaser.

Indicating the growth of diesel production, Mr. Dickson cited the fact that whereas the total diesel production in America in 1940 was 4,500,000 hp, more than 15,000,000 hp of one small series of American diesel engine alone was produced in 1941-43.

Mexico Plans Highway Development in 1944

Mexico plans to carry on with the improvement of its already-considerable transportation system during the present year, including highways, railroads and airlines. The Inter-American Highway, part of the great Pan American Highway system, will be extended toward the Guatemala border, to link with the roads already completed in Central America, according to a recent report from the Office of the Coordinator of Inter-American Affairs.

At present the Inter-American Highway in Mexico and Central America has an all-weather surface in Mexico from Nuevo Laredo, on the Texas border, to Oaxaca in southern Mexico, a distance of 1,087 miles. Asphalt paving extends as far south as Huajuapán, with all-weather gravel surface from that point to Oaxaca. Near the Guatemala border there remain unfinished gaps amounting to about 400 miles, and in the Las

"Jest aint the same war"

That squad of pick and shovel experts of World War I isn't around for this War. Instead, there is a squad of B-G Ditchers digging faster and twenty hours a day.

Yes sir, it's a different war. Eight-foot trenches or two-foot drains, clay or rocks, it's all the same—the old shovel squad is mechanized. Better ditches, too, smooth sidewalls and straight as a bazooka barrel. Digging trenches in this war is as easy as chauffering for the general. Write for B-G Catalog 44.

44-5

B-G Model 44-C Army Ditcher digging 18" drainage ditch for new American bomber base being built in England by Aviation Engineers.

BARBER-GREENE
AURORA ILL.

Equipment Overhaul In Ala. Highway Dept.

Division 3 Shops Equipped For All Minor Repairs of Light and Heavy Machines Used by the Division

Part II

THE shops of Division 3 of the Alabama Highway Department are located adjacent to a convict camp on the outskirts of Tuscaloosa, the home of the Crimson Tide of the University of Alabama. The Division office is in town, in a brick building of standard design and construction. The Division warehouse and shops are housed in a corrugated-iron building 45 x 125 feet in plan, with the shop office at the front. Immediately in front of the office are the gasoline pumps, a wooden grease rack open at the side for easy access, and a concrete washstand draining to an adjacent ditch. Also, in the graveled yard between the entrance gate and the shops, is a 30,000-gallon concrete storage tank, with heating coils, for asphalt. A distributor is used to haul asphalt from a siding to the tank, and the same machine pumps its load from the tank when filling for work on the road. A spur track adjacent to the yard is planned as a post-war addition to the plant.

Shops and Warehouse

The office for the Division Superintendent of Equipment is located at the front of the shops and warehouse. Immediately behind it is the parts department, where the modest stock of necessary parts is stored in wooden bins, and behind a wired enclosure there is a small stock of tires. In this section also is a Worthington garage compressor and a General Electric Tungal battery charger.

In the shop proper there are seven wide doors admitting trucks and other equipment from one side, while two-thirds of the length of the other side is occupied by a continuous bench for the mechanics. There is also a wide door at the end opposite the office and parts section. Special wood stands have been built to hold torn-down equipment awaiting parts, to keep them separate and easy to sort. A series of lock boxes on the wall provide safe storage for the personal tools of the mechanics.

The shop equipment includes: a brake riveter; a Black & Decker grinder and buffer; a Storm, and a Rottler boring bar; a Cincinnati electric grinder and buffer; a Black & Decker valve-refacing machine; a heavy-duty Buffalo drill; a Sioux electric hand drill; and a Manley hydraulic press. In the shop there are three 1-ton hoists for handling heavy pieces of torn-down equipment, and just outside the shop is a radiator tester.

The blacksmith and welding shop is located at the end of the main shop and has a forge, anvil, welding table, and an extra large vise. There are two double A-frames with 1-ton blocks for handling heavy parts, and a Weaver hydraulic floor jack.

This Division operates its own sign

shop, while others have turned theirs over to the Maintenance Division for operation entirely by convict labor. The shop at present has one painter and a convict helper. Air for the DeVilbiss paint spray outfit is piped from the main shop. Metal signs are straightened and repainted in this shop and special wooden signs are made up.

The shop has a double saw table for cutting and ripping, with a roller carriage for the cutting table and a special chute to hold the long pieces that are being ripped. These tables are run by an electric motor, but just outside the side door of the shop an old gasoline power unit has been set up so that if electric trouble develops, the shop can be run by the gasoline unit. A well-built lumber rack holds the various sizes of



C. & E. M. Photo
The 45 x 125-foot corrugated-iron building at Tuscaloosa which houses the warehouse and shops of Division 3, Alabama Highway Department.

timber separate and easily accessible.

The back of the shop is in two levels, the lower one of which is used for the storage of cut lumber and creosoted posts and the upper for sign storage. At the rear is a circular creosoting tank 4 feet deep for dipping the ends of sign posts. The posts are dipped and then

stood up on a draining rack of sheet metal so that the excess runs back into the tank.

Outside Equipment

This Division, as is the case with most southern highway departments, makes
(Concluded on page 78)

FOR CONCRETE CONSTRUCTION

When you bid on a concrete structure, whether it be a bridge, a water treatment plant, or any project involving concrete, you take advantage of the substantial savings that Economy Steel Forms can make. Our engineering staff is at your service without obligation. Write, wire, or phone.

Placing concrete can often be expedited by moving Economy Forms in large groups or set-ups—one of the many vital Economy features.

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**STERLING
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**BUILD FOR
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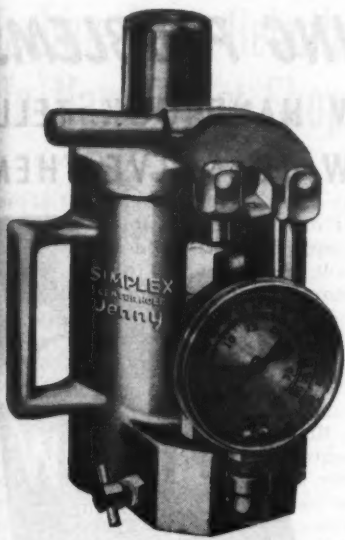
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A new hydraulic puller for many jobs in both shop and field.

Time-Saving Hydraulic Puller Self-Supporting

Time-saving was an important consideration in the design of the new Simplex Jenny center-hole hydraulic puller, recently introduced by Templeton, Kenly & Co., for, it is stated, the unit has performed presumably impossible tasks in construction, shipbuilding and similar fields of operation. It pulls bushings, cylinder liners, cutless bearings, pistons, wrist pins, valve seats, keys, wheels, sprockets, gears, boiler tubes and pipes, and can also be used to pull structural members together for welding or riveting. In addition to pulling, pushing and lifting, the Simplex Jenny can also be rigged up as a portable press, and can operate vertically or horizontally without heavy auxiliary equipment. The center-hole construction makes it self-supporting.

The puller comes in five models, three with single pumps and two with high and low-speed pumps which may be operated separately, alternately or together. Capacities range from 30 to 100 tons, and each unit is comparatively light in weight. Alloy-steel rods are recommended as it is stated that the Simplex Jenny will stretch, collapse or pull apart any mild-steel rod that will fit through the center hole. Its heat-treated alloy construction withstands heavy loads, and each piece of equipment is tested for 50 per cent overload before shipment.

The manufacturer, Templeton, Kenly & Co., 1020 So. Central Ave., Chicago, Ill., will be glad to send descriptive Bulletin No. 43J on request, if you just mention CONTRACTORS AND ENGINEERS MONTHLY.

Used Equipment Helped Supply Construction Jobs

Through the War Production Board's Regional Offices, 12,728 pieces of used construction equipment were supplied for construction jobs in 1943, WPB's Construction Machinery Division announced recently. These items, conservatively valued at \$64,000,000, represent a saving of approximately 126,000 tons of raw materials which would have been required to produce new equipment for use on these jobs.

Approximately 90 per cent of all new construction equipment is now needed overseas, and civilian needs at home can be filled only by putting idle used equipment into service. The inventories of available used equipment compiled in the WPB Regional Offices, through registration of machines, make it possible to check applications for new equipment against listings of available used equipment. If used equipment is available, application for new equipment is denied. These inventories have also been useful in supplying equipment for short-term jobs where no attempt has been made to obtain new equipment.

The types of heavy equipment most in demand, shovels, cranes, draglines, motor graders, and tractors, still must be registered, but the number of other types of equipment which had to be registered under the original order has been reduced through subsequent amendments, as the demand for that type of equipment decreased.

New Division Engineer For No. Atlantic Division

Announcement has been made of the assignment of Colonel Albert H. Burton, Corps of Engineers, to the North Atlantic Division as Division Engineer. Col. Burton, who was graduated from West Point in 1925, served in the River and Harbor Section, Office, Chief of Engineers, from July to October, 1940, when he was assigned to the Construction Section Office, Chief of Engineers, which was redesignated as the Construction Division on December 16, 1941. Col. Burton continued there until May, 1943, when he became District Engineer, Philadelphia

Engineer District. This assignment lasted until his new appointment to the North Atlantic Division.

During the past several years the major accomplishments of the North Atlantic Division have included construction of the lend-lease bases in the Caribbean, construction of airfields and depots in Africa, in Canada, Newfoundland and Greenland, and of the road to Russia through Iran. Approximately

\$15,000,000 worth of purchases of Engineer military supplies are being placed through its offices each month at the present time, including such divergent items as printing ink and heavy construction equipment, photo-engraving acids and portable steel bridge components. In addition, the tremendous amounts of equipment handled by the Engineer Depots now come under the jurisdiction of the Division Engineers.

MONDIE DROP and UPSET FORGINGS FOR CONSTRUCTION EQUIPMENT

Such as Dipper Teeth, Trencher Teeth, Gear Blanks, Levers, Tie Rods, Cranks, Crank Shafts, Special Shapes, etc. Forging weight range from 1 to 50 pounds.

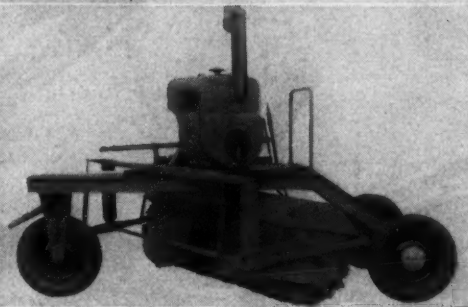
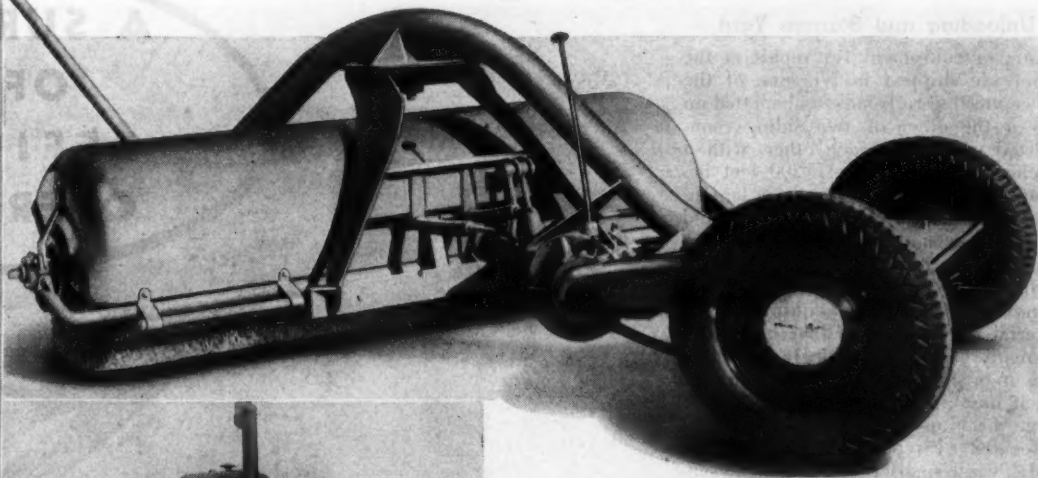
Inquiries given prompt attention by our Engineering Dept.

MONDIE FORGE COMPANY INC.

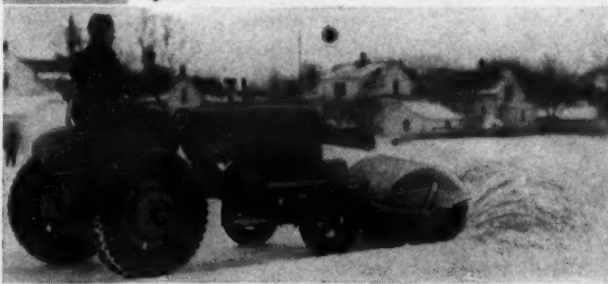
10299 Berea Road

Cleveland 2, Ohio

There's a HOUGH SWEEPER for every requirement



Hough Model "B" Universal Road Sweeper. A heavy duty, engine-driven machine with a sweeping path of 72'. Two direction brush sweeps to either right or left, at adjustable speed.



Hough Tractor Sweeper. A power-driven rotary broom mounted on a small tractor; making an efficient unit for general sweeping and snow removal.



Hough Combination Tractor Sweeper-Blower. A low cost complete unit with a 6' sweeping path. Sweeper readily detached. Ideal for removing dust and fines from old surfaces before prime or seal coating.

Types for every municipal, county, state and airport need and for road builders and contractors. Universal Tu-way traction powered units like the one above for use with trucks and tractors, Universal engine-driven units and units for attachment to the front end of wheeled tractors. Also sweeper-blower combinations. Provide effective removal of snow, dirt and debris.

THE FRANK G. HOUGH CO.
Libertyville, Illinois

HOUGH

"HUFF"

Tractor Shovels

Road Sweepers

Navy Construction Units Prepared for Overhauling

(Continued from page 1)

for delays occasioned by the breakdown of vital equipment, and that which has been through the rigid inspection and job testing which are a part of the operations at this Bureau of Yards and Docks Equipment Repair Depot should give no more trouble in the field than a piece of equipment shipped directly from the factory where it was made.

Equipment which has been through such punishing service as to make that type of rebuilding impossible or uneconomical is reconditioned to high but less exacting standards and shipped to continental stations for use in further construction and the maintenance of these facilities.

An idea of the magnitude of these repair operations can be gained from the fact that during one typical week 74 pieces of equipment were repaired or rebuilt to the standards considered acceptable for shipment to advance bases and 66 pieces were repaired for continental use. In addition 183 pieces were still undergoing repair at the end of the week.

Unloading and Storage Yard

Cars of equipment for repair at the Depot are shipped in, via one of the two connecting railroads, and spotted on one or the other of two sidings constructed parallel to each other, with a spacing of approximately 200 feet between. Each siding is $\frac{1}{2}$ mile in length, approximately level, and constructed at natural ground level to facilitate unloading operations. Heavy self-propelled equipment is unloaded over stationary or movable ramps. Other equipment and material are unloaded either by one of the many cranes available for the purpose or in some cases by hand to trucks which haul it to the place of storage. Large machines are stored in the open, segregated by type, manufacturer, and model, while smaller equipment and materials are stored in the numerous buildings which have been provided for this purpose.

Equipment is first cleaned sufficiently at the storage yard so that a careful inspection can be made by trained personnel to ascertain the condition of each piece of equipment received. Recommendations as to the future use of the equipment and estimates of the cost of necessary repairs are made, subject to correction after the machine has been completely dismantled and reinspected more thoroughly.

Repairs are not necessarily made in the same order as receipts of equipment. Some pieces for which there is little demand may wait in storage for some time before being repaired, while in other cases a piece of equipment may be thoroughly cleaned, inspected, and the dismantling begun within a very few hours after it has reached the station.

Heavy-Equipment Shop

Heavy equipment to be repaired is delivered under its own power to the heavy-equipment machine shop. This shop is fully equipped to effect all types of repairs to tractors, shovels, cranes, draglines, ditching machines, graders, dirt-moving scrapers, and similar heavy-duty equipment. Among its facilities are special tools to repair and maintain crawler treads, such as portable presses for removing sprockets and gears, final-drive and transmission tools, a varied assortment of special wrenches, and a Bros 100-ton hydraulic press for the track pins and bushings on crawler equipment.

Another important machine in this shop is the electric brake-drum grinder. This is used to grind large brake drums, rollers, shafts, and idlers to an even size

after they have been built up in the welding shop and, in many cases, has eliminated the necessity of installing new brake drums.

The first step in the repair of equipment is a thorough cleaning at one of the wash racks, using live steam generated in a 75-hp boiler, which was on the job, and delivered to the racks through 2-inch pipe. Kerrick Kleaner is mixed with water in proportions of 1 pound of compound to each 10 gallons of water in an open-top 55-gallon metal barrel. A steel rod is mounted vertically in the center, with the top end bent to form a crank. Wooden paddles attached at right angles to the vertical rod stir the solution when the crank is turned by hand. The solution of cleaner and water is fed into a 50-gallon storage tank mounted adjacent to the boiler and jetted into the line carrying the live

(Continued on next page)



PUMPING PROBLEMS

NEW HANDBOOK TELLS HOW TO SOLVE THEM

IT'S FREE!

"The most valuable book of its kind!" is what engineers and contractors are calling the new Marlow Pumpbook. It describes the entire Marlow line . . . contains a large section of authoritative Engineering Data . . . tells how to solve pumping problems. Write for it; your copy will be mailed promptly.

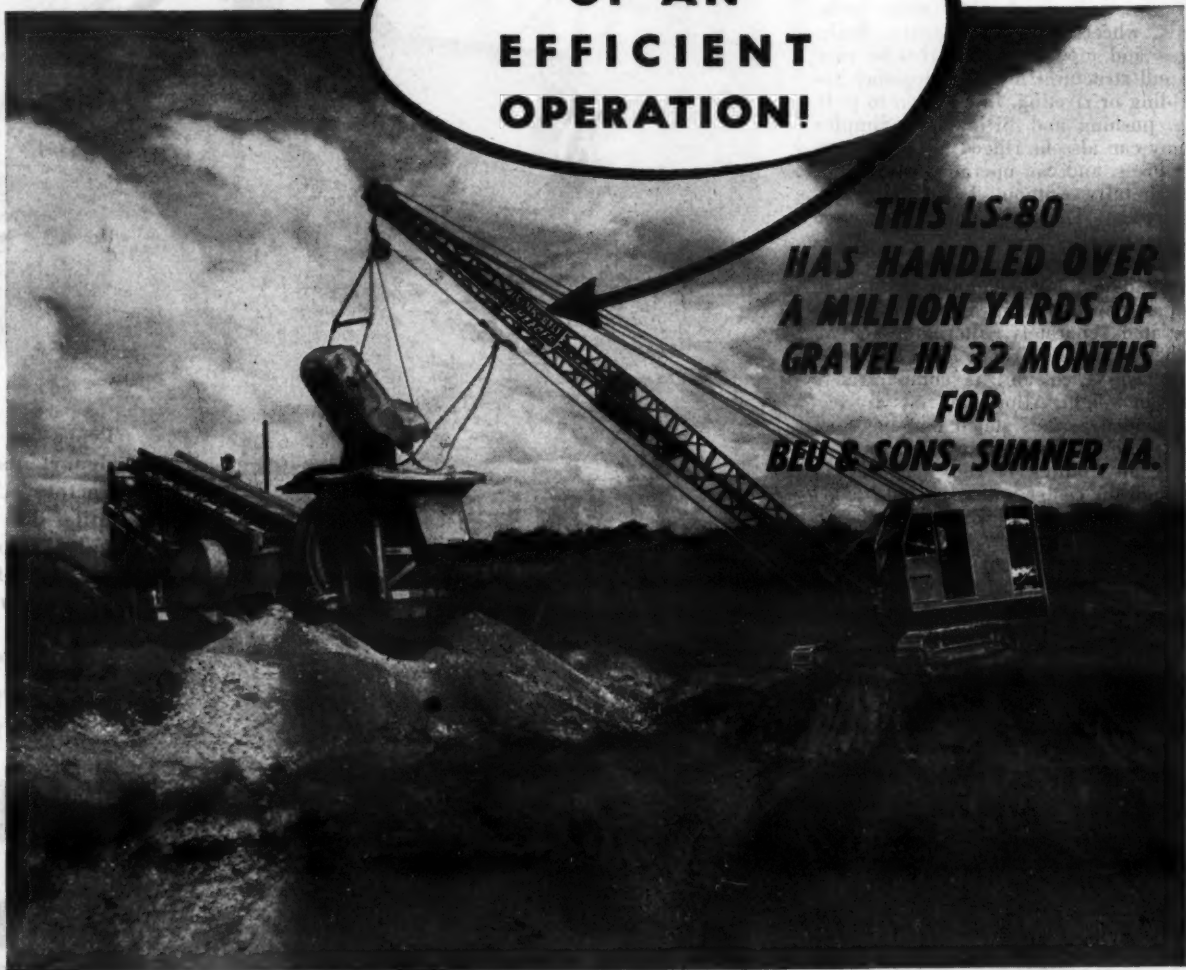
MARLOW PUMPS

Makers of the World's Largest Line of Contractors' Pumps

RIDGEWOOD 35, NEW JERSEY



A SURE SIGN OF AN EFFICIENT OPERATION!



THIS LS-80 HAS HANDLED OVER A MILLION YARDS OF GRAVEL IN 32 MONTHS FOR BEU & SONS, SUMNER, IA.

BUY BONDS

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MORE BONDS

Contractors all over the United States have found that there is extra profit in the extra strength and stamina built into these finger-tip operated machines. They are engineered for long, maintenance-free service and are giving that service even under the stress of war-time strain. There are 25 different models available—a type and size to fit every job.

LINK-BELT SPEEDER

Builders of the Most Complete Line of SHOVELS-CRANES-DAGLINES

LINK-BELT SPEEDER CORPORATION, 301 W. PERSHING ROAD, CHICAGO 9, ILL.

A DIVISION OF LINK-BELT COMPANY

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Machine Parts Rebuilt In Navy Depot Shops

(Continued from preceding page)

steam to the cleaning nozzles which are flattened pieces of pipe attached to 10-foot lengths of hose. The dirty equipment, including the engine, is thoroughly cleaned of all mud and grease before the process of dismantling is started.

A bay at one end of the heavy-machine shop is the scene of dismantling. Three overhead traveling cranes of 2 and 3-ton capacity, shop-built of scrap I-beams salvaged from bridges on the project and steel rollers, with one Yale & Towne 2-ton and two Union Mfg. Co. 2-ton chain hoists serve each part of this bay. As the equipment is dismantled, each part is loaded onto shop-built steel-frame trucks and hauled by Ford-Ferguson tractors to the section of the shop where it is to be checked for rebuilding, repair, or scrapping. Engines go to the motor shop, heavy exposed gears, track plates and rollers go to the welding shop to be built up, and encased gears, roller bearings and bushings to the machine shop where specialists inspect and check them. New factory-built gears are used exclusively for replacements of worn parts in machines designated for use at advance bases but some of the exposed gears, field replacement of which is comparatively simple, are repaired and re-used.

The Machine Shop

The machine shop is complete in every detail to handle all types of precision machine work, its equipment including six metal-cutting lathes as follows: a Fay & Scott, with 32-inch swing, 12-foot bed, and standard gear change with taper attachment, which can handle shafts 18 inches in diameter and 12 feet long; a Monarch with 24-inch swing, 14-foot bed, and quick gear change with taper attachment and thread dial, which can handle shafts 14 inches in diameter and 14 feet long; a Schumake-Boye & Emmes, with 18-inch swing, 12-foot bed, and head quick gear change, no taper attachment but with a thread dial, which can handle 12-inch-diameter shafts 12 feet long; a Whitcomb-Blaisdell lathe, with 16-inch swing, 6-foot bed, quick gear change but no taper attachment, for handling shafts 7 inches in diameter and 6 feet long; a Reed-Prentice lathe with 12-inch swing, 5-foot bed, and standard gear change with taper attachment, which can handle 4-inch-diameter shafts 5 feet long; and a Seneca Falls lathe with 9-inch swing, 3-foot bed, and standard gear change and taper attachment, for shafts 3 inches in diameter and 3 feet long. All of these lathes are driven by individual electric motors and are equipped with steady rests and some with follow rests which make possible the machining of long shafts.

Additional equipment includes a 20-inch American Tool Works Steptoe shaper with 24-inch travel; a 36-inch Mueller radial drill press which can be operated with drills from 1/4-inch or smaller up to 2 1/2-inch; a shop-built boring bar, equipped with a forward and reverse clutch and switch, and with a pilot bearing capable of boring hubs or sprockets, final-drive cases, and other large replacement parts and attachments which cannot be machined in a lathe; a Brown & Sharpe No. 4 milling machine with a 5-foot table, dividing head and tail stock, capable of producing spur gears, bevel gears up to 8 inches in diameter, spline shafts and key ways, and, most important of all, able to turn out certain gears which cannot now be purchased; a Wellman-Seaver-Morgan 200-ton 31-inch stroke 40-inch-

wide upright hydraulic press, used to straighten shafts and other replacement parts which have to be trued; two radial drill presses; a varied assortment of bench grinders, drill presses, and small precision-type turning lathes. With this equipment, the machine shop can turn out all types of shafts up to 32 inches in diameter, and all types of spur and bevel gears required for the maintenance and repair of tractors, and other heavy-duty equipment.

All parts are subjected to rigid inspection after work on them has been completed, before they are installed in the piece of equipment for which they are intended.

The Welding Shop

The welding shop is equipped with a 24-torch manifold to eliminate the use of an excessive number of oxygen and acetylene cylinders in its acetylene cutting and welding, and also has three 300-ampere Lincoln dc all-electric welders, five Hobart 300-ampere dc all-electric welders, five 300-ampere Hobart

dc motor-driven welders, three 300-ampere Westinghouse dc motor-driven welders, two 200-ampere General Electric dc motor-driven welders, and two 200-ampere Lincoln dc motor-driven units.

This shop plays a most important part

in the salvage program. When track grousers are worn appreciably, they are trimmed down to fit standard "re-tip" sizes. These tips are cut from Manganal bar stock and are welded on with stainless steel rod in stringer beads, and the

(Continued on page 76)

AMERICAN WHEELBARROWS



With Steel Wheel
for WAR ORDERS

Borrow shown is the American No. 1—4 cu. ft. struck capacity Deluxe Concrete Wheelbarrow available with steel wheel.

Code with steel wheel.....
.....PERFECT-S

THE AMERICAN STEEL SCRAPER CO., SIDNEY, OHIO

IN THE AIR FORCE..



DOWN AT THE DOCKS



Case Power Sees Things Through

WHEN the Allied drive across North Africa was at its peak and the world wondered at its speed, the Case Airborne Tractor was a secret weapon. Hardly had airfields stopped smoking after being blown up by the retreating enemy until transport planes put down these tractors, plus a complete array of hydraulic-controlled machines for earth-moving and road-making. In a few days, sometimes only three, these same fields were rebuilt and sending forth Allied fighters and bombers.

For months before . . . and in the months since . . . Case Industrial tractors with cranes such as shown in the inset picture were speeding the service of supply not only for the African area

but for every theater of war. They load and unload cars, move heavy cases and castings in docks and plants, aid the assembly of ponderous equipment. Besides the type shown, there are full-circle swinging cranes.

Case was ready to furnish the Airborne tractor because a hundred years of experience in building sturdy outdoor machinery had furnished the character it called for. Tractor building experience that began more than fifty years ago evolved the stamina and simplicity that enable Case tractors to stand up and see things through in the hands of enlisted men or plant employees.

Among the sources of this endurance is extra strength, for Case does

not believe in putting a boy at a man's job. This margin of extra strength makes Case industrial tractors ideal as foundations and power plants not only for cranes but all manner of mounted equipment—snow plows, rotary brushes, hydraulically operated loaders, winches, highway mowers.

There are four basic sizes of Case industrial tractors, with a wide variety of wheel and tire equipment to cover a weight range from 2500 to more than 10,000 pounds. For each size there is a variety of mounted equipment, produced by specialist manufacturers in their respective fields. Ask your Case industrial distributor for full information, including possible availability to you. J. I. Case Co., Racine, Wis.

CASE



KEEP ON BUYING BONDS
... TO SEE THINGS THROUGH

Routes Were Selected For Maximum Service

(Continued from page 19)

such a system would probably be less than that of a larger system that would touch more even though smaller cities.

The Committee reasoned that somewhere between these two extremes, employing basically the principle of the interconnection of larger cities, it should be possible to select a system of optimum extent, the average uses of which would reach a maximum of intensity. Considered as a whole, the average daily traffic volume for such a system would be greater than that for any other system either more or less extensive.

The Committee determined to select a system approaching as nearly as possible this optimum extent. This it conceived it could do by selecting a number of systems, both larger and smaller than the probable optimum, and by plotting the average daily traffic of each against its extent in miles. Data for such an analysis were available to the Committee in several studies previously made by the Public Roads Administration. In the five systems studied by the Public Roads Administration, the most important routes were substantially identical in location. The differences in total mileage result largely from the progressive additions of routes.

With respect to city connection, the extremes of these systems range from the smallest, 14,300 miles, which omits direct connection between a number of cities more than 300,000 population and one of 500,000 or more population, to the largest, 78,800 miles, which connects directly a large percentage of all cities with populations of 10,000 or more.

From data obtained by the highway

ESTIMATED URBAN, RURAL, AND TOTAL MILEAGE, TOTAL RURAL VEHICLE-MILEAGE, AND AVERAGE DAILY TRAFFIC VOLUME ON RURAL SECTIONS, FOR ALL HIGHWAY SYSTEMS STUDIED, INCLUDING THE RECOMMENDED SYSTEM.

Total Mileage Miles	Mileage of Systems Rural Sections Miles	Total Rural Vehicle-Mileage Vehicle-Miles	Average Daily Traffic Rural Sections Vehicles
SYSTEMS PREVIOUSLY INVESTIGATED			
14,300	12,600	32,000,000	2,540
26,700	23,300	59,200,000	2,540
29,300	25,550	66,100,000	2,590
48,300	42,380	104,900,000	2,480
78,800	70,230	150,200,000	2,140
ADDITIONAL SYSTEM TENTATIVELY INVESTIGATED			
36,000	31,350	80,981,000	2,580
RECOMMENDED INTERREGIONAL SYSTEM			
33,920	29,450	78,200,000	2,660

planning surveys, the total traffic service of existing rural roads conforming closely to each of these five previously investigated systems was estimated in daily vehicle-miles, and the corresponding average daily traffic volumes were computed. These data, together with the mileages of the systems, are given in the upper section of the accompanying table.

From a study of the mileage and average daily traffic of each of the five systems, it was found that a maximum value of average daily traffic might be obtained in the 29,300-mile system. If this value could be exceeded it was conjectured that a maximum value might be obtained by a properly selected system of either 36,000 or 33,000 miles approximately.

Accordingly, a 36,000-mile system was formed by adding to the 29,300-mile system certain routes designed to connect relatively important cities not reached by the smaller system and by eliminating a few of the less important routes. The resulting system is shown by the solid lines in the map on page 29, the heavier lines representing the added routes. The dotted lines represent the routes of the 29,300-mile system that were omitted from the larger system. As shown in the middle section of the table, this 36,000-mile system proved to have an average daily traffic volume on its

rural sections of 2,580 vehicles—slightly less than the value for the 29,300-mile system and also less than the value indicated by the previous studies of the Committee.

It was now clear, however, that by the elimination of certain of the routes added to form the 36,000-mile system, the resulting 33,920-mile system, though smaller in extent, would carry a higher average traffic volume than had been attained in either the 29,300-mile or the

(Concluded on next page)

New Wage and Hour Manual

A comprehensive guide to wage ceilings, premium wages, and work hours is provided in the 1943 Wage and Hour Manual, published by the Bureau of National Affairs, Inc., 2201 M St., N. W., Washington 7, D. C. Of particular interest to contractors on government work is the chapter on the enforcement of the Walsh-Healey Act, in which is included a summary of all decisions by the Administrator and Secretary of Labor in violation proceedings under the Act. The book also provides answers to questions regarding types of individual wage or salary adjustments which do not require prior approval, how salaried workers may be compensated for overtime without violating stabilization rules, and what bonus payments may be made without prior approval.

The manual includes a topical index to all rulings, regulations, articles and interpretations, as well as a finding list of regulations and statutes in both the 1942 and 1943 editions. Price: \$7.50.



...another reason why

HEIL Hydraulic Bulldozers and Trailbuilders

Heil engineers and fabricators have pioneered the modern practice of replacing heavy members with welded box sections that are lighter, stronger, and easy to repair in the field without costly delays. The advanced design of Heil equipment assures you of more speed . . . greater flexibility . . . and ability to push through when the going is tough. Because they're tailor-made to Cletrac Tractors, you get full visibility for safe, efficient handling.

The Trailbuilder blade is easily angled to right or left for side-casting new cuts. Bulldozer blade takes rocks and stumps without changing pace.

The Heil hydraulic system comes close to a perfect leak-proof unit—stays in adjustment and gives a minimum of trouble.

For full loads and more yardage per day and per year — at lower cost — use Heil Earth-moving equipment.

Write for bulletins.

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CLETRAC
TRACTOR
DEALER



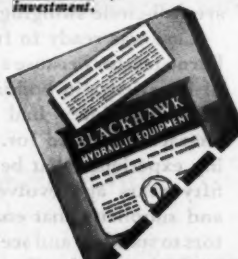
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DEPENDABLE



This seal is found ONLY on Blackhawk Jacks — your assurance of a wise and safe investment.



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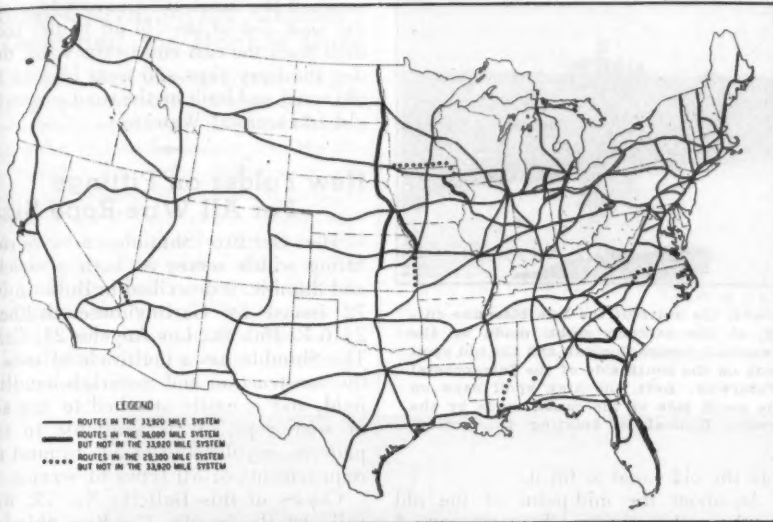
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ITS the more-for-your-money value built right into Blackhawk Hydraulic Jacks that makes them so downright dependable. They're rugged, tough, powerful; handle all jobs as they come — fast, smoothly, safely. That's why you need dependable Blackhawk Hydraulic Jacks to lick many tough wartime emergency problems of lifting, lowering, pushing, bending, testing, as well as everyday construction and maintenance jobs. Every construction engineer, foreman and maintenance man should know about MODERN Blackhawk Hydraulic Jacks, available in capacities of 3, 5, 8, 12, 20, 30 and 50 tons. Write for new Bulletin V-43 — or see your Blackhawk Distributor.

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BLACKHAWK
WORLD'S LARGEST MANUFACTURER OF HYDRAULIC JACKS



The 36,000-mile additional system investigated by the Committee.

Interregional Highway Committee Files Report

(Continued from preceding page)

36,000-mile system. The routes eliminated were those connecting the smaller cities and serving the lighter traffic volumes. The average daily traffic volume of the recommended system was found to be 2,660 vehicles.

It is believed, therefore, that the 33,920-mile system, data for which are given in the lower section of the table, is very close to the desired optimum system, and it is the system recommended by the Committee for adoption.

Conclusions

Facts on the Interregional Highway System presented thus far clearly lead to the following conclusions:

1. The system, if it is to attract and serve a reasonably large proportion of the total highway movement, must connect as many of the larger cities of the country as its limited mileage will permit.
2. Whatever other facilities it may provide, the system must incorporate adequate routes leading directly into the larger cities, including at least most of the cities of 10,000 or more population.
3. Especially in the more densely populated sections of the country, the general directness of the routes between larger cities should not be sacrificed for

close approach to cities of substantially less than 10,000 population. When these small cities lie conveniently in the path of direct routes, they may be adequately served by a skirting location of the main route. Such a location will be generally in the interest of the preponderant part of the traffic.

The recommended interregional system conforms generally to the principles enunciated in these conclusions.

The National Interregional Highway Committee, which served in an advisory capacity to Federal Works Administrator Major-General Philip B. Fleming, was composed of: Chairman, Thomas H. MacDonald, Public Roads Commissioner; G. Donald Kennedy, then State Highway Commissioner of Michigan and now Vice President, Automotive Safety Foundation; Bibb Graves, former Governor of Alabama; C. H. Purcell, State Highway Engineer of California; Frederic A. Delano, Chairman, National Resources Planning Board; Harland Bartholomew, City Planner of St. Louis, Mo.; and Rexford Guy Tugell, Chairman, New York City Planning Commission.

Another Authority Urges Planning Now

The construction industry has a major responsibility and a major interest in preventing the pyramiding of unemployment during the post-war reconversion period. Discussing this subject at the 25th Annual Meeting of the Associated

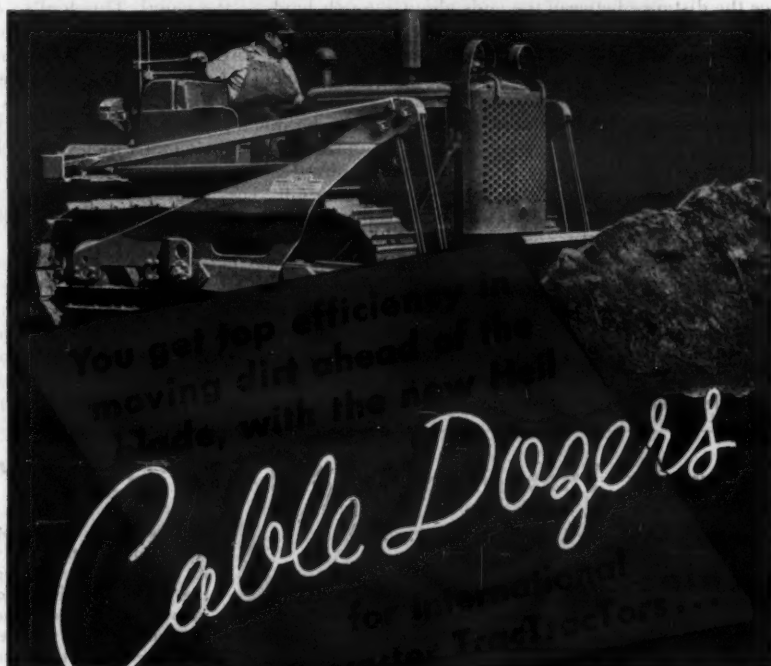
General Contractors of America in Chicago, Ill., on February 8, 1944, S. Harris Livingston, Chief, National Economics Unit, Bureau of Foreign and Domestic Commerce, pointed out that at the present time construction is employing less than 700,000 persons to produce an annual volume of no more than \$5,000,000,000, of which at least half is for direct war purposes. The industry's contribution to the total volume of business which would accompany relatively full employment after the war should be at least three times that figure. If it is to make the maximum contribution to prompt reemployment of war workers, the expansion in civilian construction in the first year or two after materials and man-power are again available will have to be much more rapid than has ever occurred in the same period of time.

The worst bottleneck will be all of the decisions which have to be made between the time people first start thinking about that new house or factory or public works project and the time the first shovel of dirt is turned. Vague "plans"

will provide no post-war construction jobs. There is real danger that the necessary site acquisition, blueprints, specifications, financial arrangements and legal clearance will not be completed. There is no reason why most of these decisions cannot be made now, so that construction can start as soon as materials and man-power are available. Certainly we all should make an effort to see that they are made.

American Lumber & Treating Shifts District Managers

A territorial trade which sends Gordon M. Dewart, New York Local Sales Manager, to San Francisco, and returns Hobart Uhl, Local Sales Manager in San Francisco, back to the East, has been announced by the American Lumber & Treating Co., Chicago, Ill. The fact that Mr. Uhl handles transcontinental traffic as well as his sales work made it necessary to establish him where some assistance is available. This will be rendered by Robert Shipp in New York.



This new equipment is designed to give perfect balance with International TracTractors, so that the full power of your tractor drives on the blade—moving more "pay dirt" with each load.

In every way, tractor and equip-

ment work together in a perfectly matched team. The simplified mounting does not obstruct the operator's view, but gives him full, free vision ahead. Note the convenience of the controls which are adjustable to his reach.

The machine "feels right"—performs smoothly, gives fast, positive action under the toughest conditions. Send for bulletin describing many other features which assure you of outstanding performance at lower cost.

R-23



BROWNHOIST BUCKETS

The greedy jaws of Brownhoist clamshell buckets speed up material handling in dirt, clay, coal, gravel and ore. Their deep, clean bites practically eliminate hand shoveling. Extra sturdy. Large sheaves reduce rope wear to a minimum. AVAILABLE IN ROPE-BEEVE, POWER-WHEEL AND LINK-TYPE. For facts and prices write to Industrial Brownhoist Corporation, Bay City, Michigan. Offices in New York City, Philadelphia, Pittsburgh, Cleveland and Chicago.



Dredging Improves Southern Waterway

Clamshell Dredge Conical With 240-Foot Boom Makes Cut-Off at Isle Maronne, La.; Eliminates Three Curves

Part III

THE dredge Conical, owned by the Sternberg Dredging Corp. of New Orleans, La., (C. & E. M., Jan., 1938, pg. 12) had a special problem to solve at a cut-off on the Intracoastal Waterway at Isle Maronne, La. This is part of the work being done by the New Orleans District, U. S. Engineer Department, to widen and improve 302 miles of this important inland waterway. (See C. & E. M., January, 1944, pg. 60.) The 7,000-foot Isle Maronne cut-off will reduce the distance between the ends about 2,000 feet and eliminate three curves which have been difficult for the longer tows to navigate. Curves are even more troublesome for tows to negotiate than are sharp curves on highways for long motor vehicles. The tows are lashed together tightly with three or four barges behind a tow boat, making an inflexible line to be steered successfully around obstacles and curves. In some cases the tow boats push, instead of tow, the barges, and in these cases the steering of long tows at bends or curves is even more difficult.

The 240-foot boom of the Conical with its 5-yard Williams clamshell bucket was used effectively in starting the cut-off



C. & E. M. Photos

Above, the start of the Isle Maronne cut-off, at the extreme right, made by the clamshell dredge Conical, and the old spoil bank on the south side of the Intracoastal Waterway. Left, the high spoil bank on the north side of the canal, made by the dredge Conical in starting the cut-off.

where there was insufficient spoil area available between the canal and the cut-off at the beginning of the excavation. It was necessary for the Conical to reach over to the south of the canal, make the cut, and then deposit the spoil on the north bank of the canal. This had to be done for a distance of 600 feet before the right-of-way area between the cut-off and the canal became wide enough to accommodate the spoil. There was also a considerable volume of old spoil on the south bank of the canal which had to be removed at the start of the east end of the cut-off. This retarded the advance of the Conical during this phase of the work.

The initial excavation for the cut-off, done by the Conical, was 10 feet deep and 100 feet wide so that tows could use the new waterway. Then it was finished later to 125 feet x 12 feet deep by a hydraulic dredge, with the tows using the new section and the dredge discharging

south of the canal, the Conical dug from the west end of the cut-off to the road, then from the east end to the road, then dug the ferry slips and went back to the old canal and built up the road across the old Intracoastal Waterway.

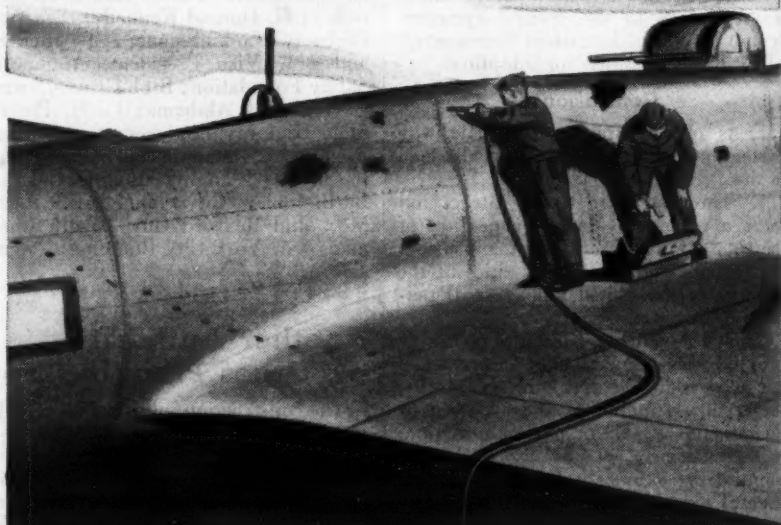
New Folder on Fittings For All Wire-Rope Sizes

The Gar-Bro Shackle, a wire-rope fitting which serves as both a shackle and thimble, is described in Bulletin No. 72 issued by Garlinghouse Brothers, 2416 E. 16th St., Los Angeles 21, Calif. The Shackle has a multitude of uses in the construction and materials-handling field, and is easily attached to any size of wire rope. It is available in two patterns, regular and heavy, to meet the requirements of all types of service.

Copies of this Bulletin No. 72, with full details on the Gar-Bro Shackle, may be secured by those interested direct from the manufacturer by referring to CONTRACTORS AND ENGINEERS MONTHLY.

WHEN REPAIR CREWS Take Over

They're doing a great job — those ground crews — repairing damaged planes and other fighting equipment at front line bases, and everywhere. For operating riveters and other repair and assembly equipment, air compressors are powered by sturdy, dependable air-cooled gasoline engines. One more front line duty for the hundreds of thousands of Briggs & Stratton engines now "In Service".



For Trucks That Must Be Able To "Take It" and Road Machinery

Newly developed facilities required to meet the exacting needs of the world's toughest customer for power transmission control in heavy-duty trucks, tractors and other war machines, have produced more rugged types and sizes of



are designing your post-war models, is the time to let our engineers give you the benefit of their war-gained experience. Their recommendations will help you specify clutches and power take-offs that will give your peace-time equipment competitive construction advantages that will help keep your plant busy.



SEND FOR THESE HANDY BULLETINS ON POWER TRANSMISSION CONTROL

Show HOW the money-saving advantages of ROCKFORD CLUTCHES and POWER TAKE-OFFS improve the efficiency and economy of power units. Give capacities, dimensions, shaft sizes, types of bearings and other needed specifications.

ROCKFORD CLUTCHES and POWER TAKE-OFFS

With men staking their lives on the reliability of power transmission, all "maybes" has been engineered out of power units going into war machines. And one day, this new degree of ruggedness and dependability will help improve tractors and other powered road machinery that must serve under conditions that would wreck ordinary equipment.

There is no priority on planning. Now, when you

ROCKFORD DRILLING MACHINE DIVISION

BORG-WARNER CORPORATION

314 Catherine Street, Rockford, Illinois, U. S. A.



Pullmore Multiple-Disc Clutches • Over-Center and Spring-Loaded Clutches • Power Take-Offs

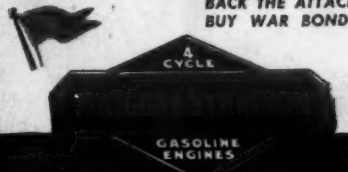
Just as Briggs & Stratton engines have been war-proved, so have our facilities for manufacture. The way those rugged, dependable engines have come through with flying colors is definite proof that Briggs & Stratton high standards of quality materials and precision manufacture could be, and are being maintained in face of wartime production schedules.

Our engineering and production staffs are geared up to help you on present war needs, or on your planning now for future production of gasoline powered equipment.

"It's powered right — when it's powered by Briggs & Stratton."

BRIGGS & STRATTON CORP. MILWAUKEE 1, WISCONSIN, U.S.A.

BACK THE ATTACK BUY WAR BONDS



Under-Carriage for Cranes Designed for Double Duty

The new Maxi three-axle crane under-carriage was primarily designed for off-the-highway crane and dragline service, where the terrain is uneven and the going rough. The same features of stability and flexibility make it equally adaptable as a yard crane, being capable of working either from the rear end or from over the side, with ease of manipulation and maximum stability throughout the entire 360 degrees of operation, the manufacturer states.

The features of the Maxi pneumatic-

tire crane under-carriage, which is available in three models of 10, 15 and 20-ton capacities, are described and illustrated in a new 4-page bulletin CC-6-43, copies of which may be secured direct from Six Wheels, Inc., 1550-84 East Twentieth St., Los Angeles 11, Calif., by mentioning CONTRACTORS AND ENGINEERS MONTHLY.

Quarry Equipment

The line of McLanahan quarry equipment, including roll and jaw crushers, feeders, washers, screens, and conveyors, is described and illustrated in a

complete catalog recently issued by the McLanahan & Stone Corp., Hollidaysburg, Penna. For more than a century, this company has been active in the quarry field, as both an operator and machinery manufacturer and, with this background of experience, is prepared to design complete quarry-plant layouts to solve any operating problems.

Copies of this catalog with complete information on the features of the various types of McLanahan quarry equipment may be secured by interested contractors and state and county highway engineers direct from the manufacturer. Just mention this item.

Schramm Hose Reels

The Schramm line of air-hose reels is described and illustrated in a bulletin recently published by that company. These reels are easy to mount, have a built-in valve of heavy brass to control the air in the entire length of hose, and are of sturdy construction, with all the weight supported on heavy bronze bushings on steel spindles.

Copies of the bulletin, HR-43, and further information on these products may be secured upon request to Schramm, Inc., West Chester, Pa., and mention of this magazine.



Buy More War Bonds and Stamps

PAVING THE WAY TO *VICTORY!*

Working today with the Armed Forces on various construction projects, preparing airfields and military roads in widely scattered portions of the globe... Blaw-Knox construction equipment is helping the cause of freedom in many different ways.

When the gigantic international reconstruction program begins, the facilities and long experience of Blaw-Knox will be called upon to supply contractors everywhere with machinery in full keeping with

the times and with the work to be done.

In the chemical and process industries, Blaw-Knox offers products and services equally helpful. This is also true of fabricated and highly specialized products for the iron and steel and non-ferrous industries—for railroads, public utilities, electronics and for industry in general.

You may find Blaw-Knox products and service useful to you for present production and future planning. We invite a discussion with you on these matters.

Blaw-Knox construction equipment will play an important part in building the World of Tomorrow.



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A PACEMAKER FOR
AMERICAN INITIATIVE
AND INGENUITY

COMPANY

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LEWIS FOUNDRY & MACHINE DIVISION,
Rolls and Rolling Mill Machinery

POWER PIPING DIVISION, Prefabricated Piping Systems

NATIONAL ALLOY STEEL DIVISION,
Heat and Corrosion-Resistant Alloy Castings

PITTSBURGH ROLLS DIVISION,
Rolls for Steel and Non-Ferrous Rolling Mills

BLAW-KNOX DIVISION, Chemical & Process Plants
& Equipment, Construction Equipment, Radio & Transmission Towers... General Industrial Products

COLUMBUS DIVISION, Ordnance Material

UNION STEEL CASTINGS DIVISION,
Steel and Alloy Castings

MARTINS FERRY DIVISION,
Bolots Anti-Aircraft Gun Mounts

BLAW-KNOX SPRINKLER DIVISION,
Automatic Sprinklers and Deluge Systems

Four Blaw-Knox Plants have been awarded the Army-Navy "E" for war-production excellence

A FEW VICTORY PRODUCTS

ANTI-AIRCRAFT GUN MOUNTS

GUN SLIDES

LANDING BARGES

POWDER PLANTS

PIPING FOR NAVAL VESSELS

SYNTHETIC RUBBER PLANTS

CAST ARMOR FOR TANKS & NAVAL CONSTRUCTION

CHEMICAL PLANTS



A new individual water bag for road gangs and construction crews.

New Individual Bags For Clean Cool Water

State and county highway engineers and contractors who have the task of equipping road or construction crews will be interested in the new canvas water bag, recently put on the market

by the H. Wenzel Tent & Duck Co., to provide individual supplies of clean cool water. These bags are made of processed material which controls the seepage of water in accordance with prevailing air temperature, so that the cooling process of evaporation is also automatically regulated in accordance with temperature. The manufacturer states that the water will keep cool even in 100 degrees sunshine.

This new Minute Man type bag also requires no preliminary soaking and is ready for immediate use. Other features are the hardwood mouth piece, the hardwood carrying handle and strong rope hanging handle, which make it easy to carry by hand or slung over the shoulder or on a tractor or other machine. The carrying handle is removable to facilitate cleaning. The bag holds 2 gallons of water, and itself weighs less than a pound.

Further details on these Eagle Brand water bags may be secured upon request to the manufacturer, H. Wenzel Tent & Duck Co., 1037 Paul St., St. Louis, Mo.

Using Raw Chemicals To End Ice Hazards

The use of raw chemicals such as calcium chloride or rock salt to check or prevent the formation of ice on heavily traveled highways is not uncommon practice. In Michigan, raw chemicals are not used on any concrete pavements but CC rock salt is used on black-top and gravel roads without an abrasive. The rock salt does not dissolve as rapidly as the calcium chloride but bores holes in the ice and thus aids in breaking it up under traffic. It costs about \$9 a ton sacked and is used on all curves and tangents on primary roads for the full width of the traveled way.

An interesting example of the value of Vinsol-resin-treated cement was brought to our attention by C. H. Apple, District Engineer, Illinois Division of Highways. Three years ago the north side of a new highway just outside of Chicago was paved with standard portland cement in the concrete and the other side was paved with a concrete

made with Vinsol-treated cement. The north side has scaled, while the south side has shown no signs of scaling in the third year of winter traffic. The same raw chemical was used on both sides of the road and the traffic was the same.



Chinese Loads are BALANCED

Here's another good example of Chinese ingenuity. Cargo-carrying wheelbarrows are loaded to the "gills", but the load is BALANCED in such a way that only a minimum of effort is required to push the barrow.

Sterling Wheelbarrows are well known for their labor-saving qualities. Sterling sturdy, BALANCED construction centers the load above the wheel... makes wheeling a snap... permits more loads to be handled per day.

Yes, there are some Sterlings available now for civilian use—but only a few. Tell us about your urgent needs. We'll sincerely endeavor to take care of them.

STERLING Wheelbarrow Co.
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Sterling
WHEELBARROWS

A 4302-16



**Back the
ATTACK!
Buy War Bonds**

MICHIGAN can do 5 JOBS for YOU

- 1 CRANE**
2 CLAM
- 3 SHOVEL**
From Clamshell or Crane use, the $\frac{3}{8}$ yard and $\frac{1}{2}$ yard MICHIGANS can be quickly converted to shovel use by changing booms. Much time is saved because in the MICHIGAN, no changes are necessary in the operating mechanism. Full circle loading.
- 4 DRAGLINE**
On the regular crane boom, the Michigan Dragline equipment can be rigged in an hour or less. An unusually long reach is possible with this attachment, and the high speed, AIR-CONTROLLED operation of all MICHIGANS means added work capacity.
- 5 TRENCH HOE**
This attachment, with its eleven-foot digging depth, finds scores of uses in public works and private construction. Trench Hoe is available for both $\frac{3}{8}$ yard and $\frac{1}{2}$ yard models, as are all attachments pictured here.

AIR CONTROLLED

WRITE FOR
 $\frac{1}{2}$ YARD BULLETIN CE34T
AND $\frac{3}{8}$ YARD BULLETIN CE34K

MICHIGAN
POWER SHOVEL CO.

BENTON HARBOR, MICHIGAN

Changes in OPA Ruling On Dump-Truck Rentals

Several changes have been made in the OPA regulation covering rental charges for dump trucks used in construction or road maintenance work. One change more clearly defines the vehicles included under the regulation, stipulating that it applies only to dump trucks which are used primarily in "off-the-highway" construction or maintenance work. Furthermore, owners may

now lease fully maintained trucks to contractors who furnish their own drivers at an established schedule of dollars-and-cents rates, based on the capacity of the truck, without filing with OPA. Additional changes affect methods of calculating truck capacities, and the monthly increments allowed for storing and maintaining vehicles pending sale.

The war is a long way from over, so back the attack and help to bring Victory sooner by buying more War Bonds!

Westinghouse Appointments

The Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has announced the appointment of James H. Jewell as Assistant Manager of its Industry Departments. Mr. Jewell will also continue to head the company's Agency and Specialties Department, as he has since 1940. The new Assistant Manager attended Pratt Institute and Temple University, and later completed the Westinghouse graduate student course.

Leon R. Ludwig, formerly head of the Westinghouse Circuit Breaker and Protective Devices Division, has been named Manager of the Motor Division. Mr. Ludwig is the holder of more than a score of patents and worked with Dr. Joseph Slepian, Associate Director of the Westinghouse Research Laboratories, to develop the Ignitron, a power tube which converts alternating current into direct current. Mr. Ludwig succeeds R. W. Owens, former Manager of the Motor Division, who has resigned.

WOULD YOU LIKE TO HAVE A HAND IN DESIGNING

Tomorrow's **TOURNAPULL?**



**Job Trend is to Long Hauls . . .
to Profit You'll Need High-Speed
Rubber-Tired Power . . . What
are Your Needs?**

While today's 1300 fast-moving, job-proved Tournapulls are moving more yardage faster and at less cost than any other like rigs on the market, we're not kidding ourselves they're perfect—there's always room for improvement in any piece of equipment. After all the Tournapull is in the same improvement stage as the truck and track-type tractor were 20 years ago.

Your Thoughts Can be Helpful

We're constantly testing new Tournapull ideas. Better steering is needed and we'll have better steering, plus a more even application of tractive effort. But you're the man to be satisfied—you want to know "Will it make money for me?" That's why we're asking what improvements you'd like to see in the Tournapull.

Write us NOW

Check your experience with Tournapulls. Ask yourself:

- ☐ Should the Tournapull be faster?
- ☐ Have more transmission speeds?
- ☐ Should the Diesel engine be started by battery or gas auxiliary?
- ☐ Have greater horsepower per pound of load?

1923 • 1 M.P.H.



1923, first self-propelled Scraper, forerunner of Tournapull.

1944 • 14.3 M.P.H.



1944, Super C Tournapull

POSTWAR . . . ?



... up to you

We're confident the postwar Tournapull will be better and more profitable for you, but even now **ONLY** the Tournapull offers you all these profit-making features—

- ★ **2-Wheel Design**—concentrates load weight on the front drive wheels to give you greater traction, quicker acceleration and faster turning.
- ★ **Big Pneumatic Tires**—provide greater flotation and extra traction; same time cushion operating shocks to reduce repair costs.
- **Instant Starting**—no auxiliary starting engines, no fuss, no bother.
- **High Average Speeds**—up to 14.3 m.p.h.
- **Long Wheel Base**—22 feet on Super C.
- **Interchangeability**—from Carryall to Crane, Wagon or Trailer widens use and profit possibilities.

Compare these money-making advantages with ordinary earthmoving tools.

- ☐ Should tires be larger?
- ☐ Cab, seat, batteries, etc., be improved?
- ☐ What capacity Carryall Scrapers for Tournapulls?
- ☐ What type of dump trailer—slide-off, bottom dump, side dump?
- ☐ What capacities?
- ☐ What other trailers or tools?
- ☐ Crane?
- ☐ Rooter?
- ☐ Dozer?

Then write us. And don't be afraid to throw in your gripes . . . LeTourneau wants your honest opinion. Make your suggestions and do your kicking today . . . and LeTourneau will guarantee you a postwar Tournapull you can make profits with on any haul, long or short. Write NOW.

LETOURNEAU TOURNAPULLS

RUBBER-TIRED POWER FOR FASTER EARTHMOVING

Trade Mark Reg. U. S. Pat. Off.

New Type of Attack On Highway Problems

"Projective Maintenance" Which Will Consider Future Road Development Suggested as More Forward-Looking Procedure for Maintenance Men

✦ COINING a new term "Projective Maintenance", H. D. Metcalf, Chief Engineer of Maintenance, Ohio Department of Highways, in a paper presented at the Twenty-Third Annual Meeting of the Highway Research Board, called for a different approach to highway maintenance problems. Mr. Metcalf defines "Projective Maintenance" as maintenance with "an eye to the future", a vigorous forward-looking attack type of maintenance which fits into the final development of the highway, instead of the sustaining or defensive type which has been the practice in the past.

It is the aim of Projective Maintenance to engage in that form of activity which will eliminate much of the necessity for new construction after the war. Mr. Metcalf believes that if sustaining maintenance *only* becomes a habit, the problem of highway reconstruction after the war will be insurmountable. The ultimate aim is to expend one's energy so that whatever is done will dovetail with the future plans of design and construction engineers. There is both a positive and negative approach to Projective Maintenance: doing those things which will fit in with and assist in carrying out future plans and not doing those things which will be thrown out and discarded later on.

Projective Maintenance, as Mr. Metcalf sees it, should include consideration of: (1) Patches, not just good enough, but made to carry the loads for years ahead; (2) Treatment of the chronically "sick" highways; (3) Treatment of roads of insufficient surface width; (4) Narrow roads and additional right-of-way; (5) Inadequate subgrade and surface drainage; (6) Weak bases and corrective stabilization; (7) Faulty drainage conditions; (8) Safety features; and (9) Structure repair.

Projective Maintenance is not applicable to roads that have a grade and alignment unsuitable for future development, to roads that have a decreasing traffic trend, or to roads that fulfill the requirements of present and future traffic.

Summary

To summarize the points made in Mr. Metcalf's paper, highways were never more important to the nation than they are at this time. Highway transportation is vital to the prosecution of the war, and highway systems must not be allowed to go backward. Wartime conditions present new problems to maintenance engineers and a greater obligation than ever before. While construction projects are being curtailed, maintenance must be adapted to fill the gap. To defense must be added attack. To sustaining our highway system must be added "Projective Maintenance".

Wire Rope Conservation Hints in Pamphlet Form

The wire rope conservation bulletins issued from time to time by the Macwhyte Co. have received such excellent response that the company has reissued the series in pamphlet form. This pamphlet gives suggestions on selecting the correct wire rope for various equipment, protecting it against corrosion by proper lubrication, and other means of prolonging the service life of the rope. Other important considerations to watch out for are badly scored and corrugated sheaves which will cause undue rope wear, and the safety factor in selecting a rope for any given task, as the ability of

wire rope to withstand bending or fatigue decreases rapidly when loaded too heavily.

These and similar subjects are treated in the illustrated pamphlet which is designed to help users conserve their wire rope, and at the same time help the government conserve much-needed steel. A request on your company letter-head to the Macwhyte Co., Kenosha, Wis., will bring you a copy of the pamphlet. Just mention this item.

New Mack Vice President

The appointment of Henry Rowold as Vice President has recently been announced by Mack-International Motor Truck Corp., New York City. Since joining the Mack organization in a clerical capacity in 1919, Mr. Rowold has been successively executive assistant to the president and head of national account sales, which latter work he will continue as Vice President. He is also a committee member of the Central Truck Tire Rating Board of the OPA.

PRACTICAL DESIGN for ARC WELDED Construction

FIRST SERIES

If you are thinking of taking advantage of the new welding techniques together with their lower costs in the Post-War period, you will want these Design Sheets for constant reference. They cover problems from practically every industry from the construction and maintenance fields. You will find many suggestions which can be readily converted to meet your problems. Ask us for them today.

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Write Today for Your
FREE Plates. No Obligation

HOBBART

— One of the World's Largest Builders of Arc Welders —



POWERFUL Trailbuilders and Bulldozers

BONDS
SPEED
VICTORY

These rugged GW Units are now doing such a vital job for our Armed Forces in this Wartime. GW Units will again take their place in Peacetime, after having distinguished themselves for their outstanding performance.

ALSO

- 2-wheel Hydraulic Scrapers • Hydraulic Rippers
- 4-wheel Hydraulic Scrapers • Cable Rippers
- 4-wheel Cable Scrapers • Cable Control Units



GW ROAD MACHINERY
is Sold Through
ALLIS-CHALMERS
Dealers Everywhere

ROAD MACHINERY DIVISION

GAR WOOD INDUSTRIES, Inc.
DETROIT 11, MICHIGAN

Public Works Pool Is Still Bone Dry

Post-War Plans Are Mostly In the Dream Stage; ARBA Speaker Urges All Local Governments To Get Busy

By COLONEL WILLIAM N. CAREY,
Chief Engineer, Federal Works Agency,
Washington, D. C.

† THERE is a widespread belief that somewhere in Washington there exists that "shelf" of public works projects we read so much about a few years ago. A serious effort was made to create such a shelf, to make it a reality, but the war came and the effort was stopped. The shelf and its contents of plan outlines and public works dreams are too far up in the clouds of past hopes to be reached by a present-day contractor or a single workman looking for a job. The idea was good but we can't use it now. Nowhere on that shelf will be found a set of documents on which a competitively bid construction contract could be let.

It is true that public officials generally throughout the country have developed lists of public works believed necessary or desirable for their respective communities. To these lists is usually attached a "horseback" estimate of cost in box-car figures which look most impressive in print. With very few exceptions, that is about as far as our much-talked-of and much-publicized national program of local public works has progressed. To date no central governmental agency has been authorized to do even so much as to collect these lists of local projects, to say nothing of stimulating or coordinating the preparation of actual plans, specifications, and contract documents necessary to translate these dreams into actual structures.

A few cities and still fewer states are embarked now on the engineering, architectural and legal labor required between the project dream stage and the blueprint stage. The City of New York offers a notable example of forethought and enterprise in this regard, (C. & E. M., January, 1944, pg. 59) but even there, at last report, the blueprints were ready for but 15 per cent of the total adopted list of post-war projects. New York is continuing the work, however, and has an appropriation of about \$20,000,000 for plan preparation. But when you have paid tribute to the City of New York, you have about exhausted warranted tributes so far as our cities are concerned. Some planning is being done in other cities but in most instances local programs are still in the talking phase. Talk alone butters no parsnips, builds no schools, hospitals, bridges or water works, and talk alone provides no jobs. In my opinion no city or state can be said to have a post-war program unless it is right now acquiring sites, or arranging for site acquisition, producing working drawings and specifications, and preparing complete contract documents for every project planned.

Is Financing the Obstacle?

Since a mountain of talk about post-war construction projects has brought forth only a mouse of working plans and specifications, we may well ask why. The financial position of most of our local subdivisions of government is better today than it has been for many years. There are but few unable financially to pay for working plans for their needed public works, those which they badly need now or will surely need within the next four or five years. Local subdivisions of government are completely capable of deciding for themselves the improvements they need. They may not be able now to see

their way clear to finance the construction of these works but that problem is properly one to be met later. All that requires financing now are the preliminaries to construction. It is not inability to finance these preliminaries which has unduly delayed development of local programs.

Many municipalities which have money to pay for plans, and they are in the vast majority, are hesitating in order to see what Congress is going to do about post-war public works. Some local public officials of financially able municipalities have told me bluntly they do not dare take the political risk of making and paying for their needed plans until the position of the Federal government has been made clear. If they should do their planning work with their own

money and later Federal grants became available for the purpose, these officials fear the adverse criticism their political opponents might drum up against them

because they did not wait for the Federal gravy train.

Few informed persons expect Congress to wait for them.
(Concluded on page 62)

PORTABLE EFFICIENT WINPOWER ELECTRIC PLANTS

—the answer to a contractor's prayer!—

The contractor who has the most efficient tools has the "edge" over all other bidders.

This contractor, of course, has a portable air-cooled WINPOWER Electric Plant which he can easily move from job to job and depend upon in all kinds of weather, to power his drills, riveters, air compressors, etc., and provide lighting for night work as well.

Model shown—5000 watts—single or 3-phase—110 or 220-volt—60 cycle—alternating current
Complete line—from 350 watts to 25,000 watts. Send for catalog giving specifications

WIND POWER MFG. CO.
Newton Iowa



Get Wise TO THE IMPORTANCE TO YOU OF CLETRAC Tru-Traction



1. Power on both tracks at all times.
2. Move smoothly around curves.
3. Consume less power on turning.
4. Steer the same downhill as on the level.
5. Turn shorter with full loads.
6. Maneuver on side hills parallel to slopes.
7. Stop and hold larger loads on hills.
8. Handle off-center loads with least trouble.
9. Operate with power always applied.

ONLY CLETRAC Tru-Traction GIVES YOU THESE ADVANTAGES

CLETRAC Tru-Traction—controlled differential steering—was designed and developed by Cletrac more than 25 years ago. It is an advantage exclusive with Cletrac tractors but has been employed by the armed forces in high-speed, track-laying military vehicles where its value has been proved on countless military operations in which other types of equipment would have lacked the necessary maneuverability or might stall and bog down.

Isn't it sensible, then, to apply this same kind of power—Cletrac Tru-Traction—on your jobs?

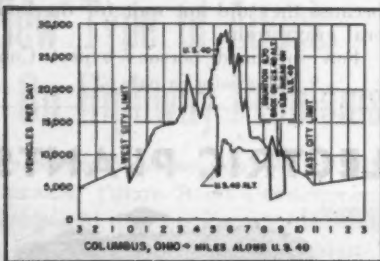
THE CLEVELAND TRACTOR COMPANY • CLEVELAND, OHIO

GET THE FACTS FROM THIS BOOK

Ask for Bulletin No. 937 for complete details of Cletrac Tru-Traction and how it operates.



CLETRAC Tru-Traction TRACTORS
GASOLINE OR DIESEL



Traffic profiles of streets in Columbus, Ohio, conforming approximately to routes of the recommended Interregional Highway System.

Traffic Problems Are Urban, Not Rural, Now

(Continued from page 2)

of traffic originating and ending within one state.

The analysis of the classification of motor-truck traffic is not exact with respect to the relative length of trip, especially as indicated by the intrastate and interstate fraction. Interstate movements may be, and are in many cases, short movements over a state line. Intrastate movement, though confined entirely to a single state, may be relatively long movement. All the available data show, however, that the average-length trip is least for the intrastate movement, greater for the interstate movement, and greatest for the transstate movement. While, therefore, the three classes are based specifically upon the number of states involved in the traffic movements, they also represent, approximately and on the average, three ranges of trip length, from short to long.

Although similar data are not available for passenger cars or for the total traffic, the Committee believes that relations similar to those indicated for trucks exist also in the passenger-car and total traffic.

Traffic Denalties

Traffic volume on main rural roads increases greatly as it approaches cities. In no cases do the data include the volume of traffic on extensions of the routes within cities, and in many cases the greatest traffic found was observed at points some distances, often several miles, outside the city limits. Particularly at the larger cities, it has been found impossible to represent by any convenient scale on any two-dimensional map the volume of traffic observed at points immediately adjacent to the cities without causing such overlapping of the bands indicating the volume of traffic for several highways as to create an undesirable graphical confusion.

The illustration on page 2 shows, by means of vertical projection of the traffic bands, the further increase in traffic volume that occurs when highways pass into and through cities between the nearest points of recorded observation. As suggested by this very approximate picturization, traffic on sections of the routes traversing the cities mounts rapidly to volumes that far surpass the general levels of volume on the rural portions of the system. However, the peaks represented on this three-dimensional traffic map are in many cases little more than informed guesses; and their sharpness is exaggerated by the unavoidable compression of the horizontal scale.

Urban Zone of Traffic Influence

A study was made of the available data on traffic flow in the vicinity of all cities of 10,000 or more population directly connected by the recommended system, with the object of determining the approximate distances from each city at which the more rapid increase of traffic volume begins. These distances have been measured as radial distances from centers located at the heart of the

central business areas of the respective cities. They define, for each city, a circular area described as the city's zone of local traffic influence.

It is found that the radii of these zones tend to increase with the population of the cities. By averaging the radii for all cities of each of several population ranges, the following determination was made of the approximate normal radii of the zones of local traffic influence for cities of different sizes:

City Population	Radius of Zone of Traffic Influence (Miles)
3,000,000 and more	35
1,000,000 to 3,000,000	30
500,000 to 1,000,000	25
300,000 to 500,000	20
100,000 to 300,000	15
50,000 to 100,000	12
25,000 to 50,000	9
10,000 to 25,000	6

Within these zones of local traffic influence around the 587 cities of 10,000 or more population are 8,141 miles of the recommended Interregional System, or 24 per cent of the entire system. Of the total mileage within these zones,

(Continued on next page)

CONNER Y'S HEATING KETTLES

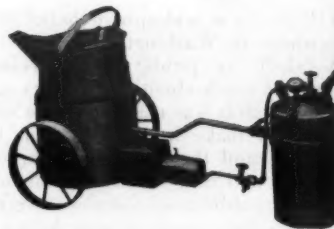


Speed up work by using a Conner Heating Kettle for building and maintaining highways, airports, barracks and roads. Made in sizes of 30, 80, 110 and 165 gallons.

Send today for our complete catalog showing our full line of Tar and Asphalt Heating Kettles, Spraying Attachments, Pouring Pots, etc.

CONNER Y
CONSTRUCTION CO.

4000 N. Second St. Philadelphia 40, Pa.



THE LONGEST MILE

How long is a mile?

By air, about as long as your watch. By express-highway, that. Miles. But the the

been neglected, handicapping local business and denying millions of people the

requirement of highways and

Above is an excerpt from a Barrett Saturday Evening Post advertisement which points out that the longest part of a journey is often a short distance over a worn-out, broken-down highway. Too often these neglected highways are important links in a major transportation system . . . feeder roads that should provide quick, easy access to primary routes.

Post-war construction of new multi-lane arterial routes will never completely solve this country's highway problem. The first responsibility of highway engi-

neers will still be to "even up" the miles for everyone—to provide the easy-riding, all-year secondary and feeder roads that are essential for local traffic and business.

Here is where Barrett Tarvia* can provide practical help. Because it meets almost every requirement for construction, maintenance and repair, Tarvia fits in perfectly with present and post-war paving programs. Call upon the Tarvia field man. He can show you how you can use local materials and labor to get the most road for your money.

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION

40 RECTOR STREET, NEW YORK 6, N. Y.

New York . . . Chicago . . . Birmingham . . . St. Louis . . . Detroit . . . Philadelphia . . . Boston
Providence . . . Rochester . . . Minneapolis . . . Cleveland . . . Columbus . . . Toledo . . . Youngstown
Syracuse . . . Buffalo . . . Cincinnati . . . Bethlehem . . . Portland, Me. . . Bangor, Me.
Norwood, N. Y. . . Cromwell, Conn. . . Norwich, Conn. . . Savannah, Ga. . . Norfolk, Va.
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Barrett
Tarvia*

*Trade-mark Reg. U.S. Pat. Off.

Interregional System Serves Short Hauls

(Continued from preceding page)

trans-city streets of the cities of 10,000 or more account for 2,123 miles, and similar streets in smaller incorporated places add 492 miles.

The balance of the mileage within these zones, 5,526 miles or nearly 68 per cent of the 8,141-mile total, is on rural sections of the Interregional System, and includes all rural sections of the system that serve traffic in excess of an average of 10,000 vehicles per day. This high-volume mileage totals 532 miles. The rural mileage within the zones of city influence also includes 3,558 miles, or 48.3 per cent, of the 7,363 miles of rural sections that carry traffic averaging between 3,000 and 10,000 vehicles per day. These two rural mileages, 532 miles and 3,558 miles, comprise 74 per cent of the total rural mileage within the zones of influence of cities of 10,000 or more population, and serves traffic well above the average daily volume for all rural sections of the system.

The remaining 26 per cent of the rural mileage within these zones, or 1,436 miles, carries traffic averaging less than 3,000 vehicles per day. Nearly a third of this latter mileage, however, carried traffic in 1941 in excess of the approximately 2,600-vehicles-per-day average for the rural highway system as a whole.

It is evident that a large part of the more heavily traveled mileage of the system and all of the most heavily traveled sections lie within relatively narrow zones circumscribed about the cities of 10,000 or more population. As further generalization, it may be added that much of the remaining more heavily traveled mileage is located closely contiguous to such zones. Obviously, the heavier travel of these sections is generated largely by local movements in and out of the central cities.

Thus, cities are of very great importance in the movements of most interregional and long-range traffic. Because of this fact, as well as its general knowledge that the most concentrated masses of population and industry are located in the cities, the Committee determined to base its selection of routes primarily upon the principle of the interconnection of important cities.

Short-Run Traffic Movements

As important as the interconnection of cities is, however, ideal directness of connection between the largest centers was not attempted. All highway traffic is a composition of long-range and short-range movements, and the highway planning surveys have shown that the latter is the predominant element on all roads. Normally, for example, about 85 per cent of all trips are for less than 20 miles, and only about 5 per cent for more than 50 miles. In the selection of routes, therefore, the Committee has deemed it desirable to deviate from ideally direct lines of communication between the larger regional centers in order to connect en route as many as practicable of the smaller urban centers.

Large and small are relative terms, however. The question upon which the Committee had to reach a decision was that of the general order of cities to be considered as primary points of connection. This decision would determine the extent of the system selected. In applying the terms "large" and "small" to the problem, the Committee considered both the population and the industrial importance of the cities. It has used its best judgment in determining the centers of primary connection and also the extent of desirable deviation from direct connection between these primary points in order to join in the system urban communities of lesser importance.

Cities Change; Roads Permanent

The location of interregional highways to serve a city as it is today, no matter what its condition may be, is a comparatively simple task. Once constructed, the interregional highway would be relatively permanent. But cities cannot be said to have attained well organized and relatively permanent forms. Because of these two things, the interregional routes must be so located as to conform to the future shape of cities, in so far as this can be foreseen, as well as to the existing pattern of urban centers.

American cities of today are surprisingly uniform in their status and condition, although no generalized description can ever adequately portray any one of them. The focal point of them all, however, is the central business district, which contains the large stores and office buildings and is often the cultural and civic center of the urban community. This "downtown area" is generally cramped, crowded, and depreciated. Land values are often less than they were

twenty years ago.

This center shades off into a secondary business area which merges almost imperceptibly with a large area of mixed land uses and run-down buildings. This is the slum area where living conditions are poor. Around the slums is an even larger area of residential property in various stages of depreciation. This is the widely discussed "blighted area". Without the application

of effective rehabilitation measures, it will become part of the city's slums.

Beyond this blighted area lie the newer residential areas. They extend far out beyond the city limits, in the form of widely scattered subdivisions, merging almost imperceptibly into the farm lands.

Interlaced through all of these sections are inadequate highways and streets, and railroads extending into the

(Continued on page 44)

Victory PARA-PLASTIC

Manufactured by SERVICISED to conform to Federal Spec. SS-F-336 and C.A.A. Spec. P-605, Para-Plastic is recognized in the concrete construction field as the one-time sealer for long-time service in Expansion and Dummy joints.

Pioneers in the manufacture of Approved Construction Materials for over twenty-three years.

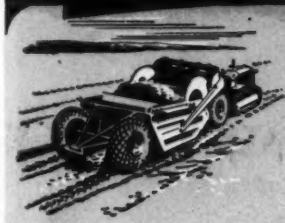


SERVICISED PRODUCTS CORPORATION

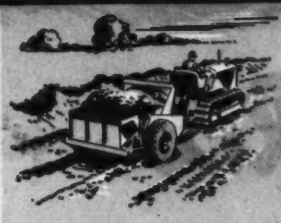
6051 West 65th Street

Chicago 38, Ill.

Are you taking full advantage
OF ALL THE JOBS
YOUR SCRAPERS CAN DO?



Stripping Top Soil



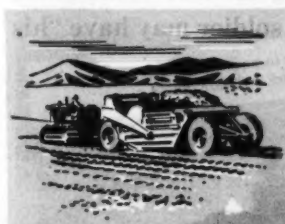
Making cuts and fills



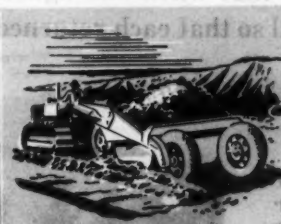
Ditching



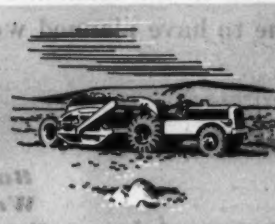
Spreading and Finishing



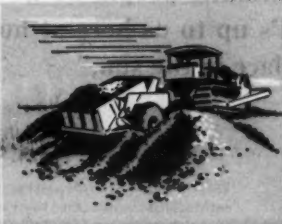
Long Haul Excavation



Opening Borrow Pits



Leveling and Grading



Dam and Levee Construction

Get Your Post-War Plans On Paper Now!

Help eliminate "leaf raking" and "made work" later by planning and promoting worthwhile construction projects now. Make your plans specific—with detailed blueprints and estimated costs worked out as closely as possible. And by all means, call in your contractors early, so that equipment and job requirements can be planned well in advance of actual needs.

Wherever you've got the problem of moving large quantities of dirt more than 300 feet, the job can usually be done faster, cheaper, better with tractor-drawn scrapers that dig, haul, and spread their own loads. The typical illustrations above are only a few of the hundreds of practical applications for these thrifty, versatile machines. And remember, every extra job you assign to LaPlant-Choate "Carrimor" scrapers enables you to save precious manpower and release less adaptable equipment for other vital war work. See your nearest LaPlant-Choate "Caterpillar" distributor for helpful job application data, plus efficient parts and repair service, designed to keep your scraper equipment working full-time for Victory. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa.



LAPLANT-CHOATE

Earthmoving and Land Clearing Equipment



Operated by Mike Welch, contractor of Annandale, Minn., this Universal portable quarry plant with apron feeder is one of a number of Universal plants used to produce gravel for the Alaska Highway.

Seeking Deferment For Maintenance Men

The problem of keeping the maintenance crews of state highway departments intact to continue the proper service of the highways to wartime traffic is growing greater day by day, with

men leaving for higher-paid jobs in war plants and being taken into the armed services via the draft. In Indiana last May so many men had been lost by the maintenance department that there were not enough young men able to do the maintenance painting of the larger bridges so the work was contracted. This

condition has intensified in Indiana, as elsewhere, so that states are now in many cases taking steps to secure deferment for their maintenance employees.

Kansas has been asking for the deferment of its maintenance men ever since the draft began taking fathers. Illinois and Michigan are asking no deferments whatsoever, while Indiana is asking for deferment from service for all maintenance men down to sub-district superintendents who are married and have children. They take the cases direct to the respective boards.

Ohio has asked for deferment for only the key men in the entire organization and takes the cases direct to the draft boards. Missouri has made a practice of asking the deferment of all full-time maintenance men.

Magnetic Contactors For Welding Service

The results expected of magnetic contactors are most exacting. Certain applications require quick response, that is

the ability to open and close a circuit many times in rapid succession to meet high-speed production methods. Bulletin 1211, issued by The Electric Controller & Mfg. Co., 2700 E. 29th St., Cleveland, Ohio, describes a-c contactors built in double-pole designs for welding. This bulletin may be secured direct from the manufacturer by mentioning this item.

JOHNSON Porto-Batcher SAVES A LOT of TIME and MONEY



Quickly Set Up for Operation at the Most Advantageous Location

The Johnson Porto-Batcher is a complete highway portable batching plant. Its use permits these substantial time and money savings:

1. The Johnson Porto-Batcher can be towed behind a truck to the most advantageous point in the pouring area.
2. Since the Porto-Batcher is quickly set up for operation, long hauls of mixed concrete are eliminated. . . . the number of mixing units is reduced and the number of concrete yard miles lessened. Control of all operations is centralized.
3. All materials are delivered to the batching unit in bulk material trucks . . . eliminating extra handling equipment.
4. The Johnson patented charging skip permits full utilization of mixer capacity. By providing proper intermingling of aggregates with cement when discharged into mixer, it assures pre-mixing and pre-shrinkage . . . prevents cement from touching wet mixer opening and walls thus eliminates gumming and excessive wear.
5. All levers are grouped in one central location to permit control of operations by one man. Write for bulletin.

Write for data on Ready Mix Plant • Bulk Cement Handling Equipment • Cement Storage Bins • Concrete Buckets • Batchers

The C. S. Johnson Company
Champaign, Illinois

Change of Address

(Mail to Contractors and Engineers Monthly, 470 4th Ave., New York 16, today)

From _____
(Former address)

To _____
(New address)

Name _____

Firm _____

Position _____

Until Peace Day Dawns

WARCO

Until our boys return victorious, WARCO continues to go "all out for war," and like all thinking people we go along in the realization that when our fighting men do come back, it's up to us here at home to have planned well so that each returned soldier may have "his place in the sun."



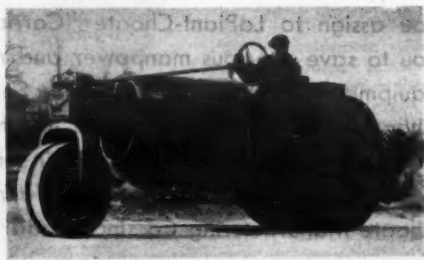
Hydraulic Scoops for fast, economical earth moving

Buy
War
Bonds
and
Stamps



Hydraulic graders for road building and maintenance

WARCO manufactures "Better-Built" construction machinery for present day superconstruction jobs. For constructing and maintaining modern highways; for fast, economical results on large earth moving jobs; for quick, satisfactory rolling and patch work, WARCO machines are unsurpassed.



Quick-Transport Machines for rolling and patch work.

Operators of WARCO hydraulic controlled motor graders and WARCO-DUPLEX hydraulic scoops are enthusiastic over the ease with which they can be operated, and with the work that can be accomplished through rapid, accurate, dependable hydraulic control.

These machines available now only on WPB release or approval—but will be ready when you can buy and we can sell to you.

W.A. RIDDELL CORPORATION, Bucyrus, Ohio

AGC Meeting Looks To Future of Industry

General Contractors Discuss Many Present and Future Problems at 25th Annual Meeting in Chicago; New Officers Elected

THE meeting of the Governing and Advisory Boards of the Associated General Contractors of America, Inc., which served as the Twenty-Fifth Annual Meeting of the association, was held at the Drake Hotel, Chicago, Ill., February 7 to 9. As this organization starts its second quarter-century of service to the construction industry, it was reported to be in its strongest financial position, with membership at its highest point, and with the accumulated experience of the past 25 years to guide its future.

H. E. Foreman, Managing Director, in his report, pointed out that the present problems of the industry are to maintain itself in spite of drastically declining markets, to continue to make its maximum contribution to the war which is far from won, and to prepare the way for the future. Due to the necessities of war, the strictest governmental controls in history have been spread over industry, and one of the association's principal duties during the past four years has been to interpret the industry to the government so that these controls permitted the industry to operate at maximum efficiency, and to interpret government regulations to the industry.

Just as construction was the first major industry to swing into war production on a major scale, so will it be the first to lead the way to peacetime operation, Mr. Foreman said. This means a return to the system of private enterprise. Because of the completeness of present government control over all kinds of business, that task will be one of the greatest the nation has ever faced, and it will be up to construction to pioneer in this change.

AGC committees have been making a study of how there can be a step-by-step return to normal operations in construction, with each step taken as soon as conditions permit, in order to avoid the confusion of an abrupt return when the war is over. Military progress will, of course, determine the timing of these steps.

Speaking of post-war planning, Mr. Foreman pointed out that the construction industry recognized immediately the importance of having a volume of post-war work planned to the contract-letting stage. Mr. Foreman has found a general understanding of the fact that the construction industry can provide a large amount of employment on and off the site, and a somewhat less general understanding that a vast amount of preliminary work must be done in blueprinting, financing and acquiring sites before sound publicly and privately financed projects can provide many jobs.

As to post-war public works, the association in its testimony before the House of Representatives Public Buildings and Grounds Committee, pointed out that one of the greatest hindrances to plan-

ning is the lack of a definite policy on the extent of Federal public works after the war and a policy with respect to Federal assistance for planning and construction. The association stated that it hoped that no Federal funds would be necessary to aid the planning or construction of local public works, but pointed to the lack of planning in the absence of Federal funds.

Millions of words have been written and spoken on the subject of post-war planning in the past two years, Mr. Foreman said, but the bald fact for the construction industry is that so far only a very small volume of projects have been planned to the contract-letting stage.

Speaking of the importance of public relations, Mr. Foreman reported that the AGC last December published the first of a series of six advertisements designed to stimulate the planning of future construction projects. The first advertisement struck the keynote of the series, "This is Blueprint Time". This project was undertaken as an experiment by the association in the expectation that it



Officers and guests at the 25th Annual Meeting of the Associated General Contractors of America, Chicago, Ill., February 7-9, 1944. Left to right, H. E. Foreman, Managing Director, AGC; William Muirhead, 1944 President, AGC; Thos. H. MacDonald, Commissioner, Public Roads Administration; Oscar E. Coblentz, retiring 1943 President; and Hal H. Hale, Executive Secretary, AASHO.

would prove of value to the members in their efforts to stimulate new markets.

Looking to the future, Mr. Foreman stated that general contractors have a great opportunity for industrial leader-

ship individually, locally through their chapters and branches, and nationally through the national association. The transition from an economy completely

(Concluded on page 57)

MOBILOADER

HELPS STEEL RAILS Go to War!

Here's the type of material being handled into trucks

THE METHOD

Removing asphalt and bricks from streetcar right-of-way in Seattle after salvage of steel rails. Athey Mobiloader does the job of loading trucks--makes fast work of it!

THE JOB

When the Northwest Construction Company of Seattle tackled their big contract to remove miles of steel rails from city streets, they turned over the important job of cleaning up debris from street surfaces to their Athey Mobiloader with exceptionally good results.

As the specially-designed rail-removing rig ripped up the salvaged steel for America's war machines, the Athey Mobiloader followed behind and loaded giant-sized asphalt slabs and pavement bricks from the right-of-way into trucks. The heavy material was hauled away at a fast clip and the clean strip, shown below, was all ready for the repaving crew to go to work.

The Athey Mobiloader, mounted on a "Caterpillar" Diesel Tractor, uses the simple overhead method of load-

ing--travels forward to pick up, or dig, its load, goes in reverse to the truck or fill and discharges the material overhead. It's a fast, simple and highly useful mobile loading unit.

Used on a variety of stockpile and other loading jobs, it's speeding up production, replacing heavier, more expensive loading equipment and cutting loading costs.

Your Athey-"Caterpillar" Dealer can supply any data you may wish pertaining to Athey Mobiloaders. He can also take excellent care of your equipment parts and repair needs. Athey Truss Wheel Co., 5631 W. 65th St., Chicago 38, Illinois.

"Every speck" of debris removed when Mobiloader is finished

Athey

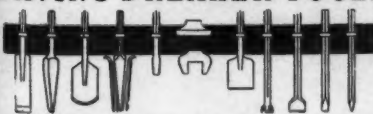
MOBILOADERS

THE Results

AMERICAN FREE ENTERPRISE CREATES PROSPERITY!

"BICKNELL BETTER BUILT"

PAVING BREAKER TOOLS



We manufacture a complete line of tools for pneumatic paving breakers, rock drills and diggers.

Write for descriptive circular

BICKNELL MANUFACTURING CO.

12 LIME STREET

ROCKLAND, MAINE



STORAGE. Cranes in the storage lot at the Bureau of Yards and Docks' Construction Equipment Repair Depot at McAlester, Oklahoma, awaiting overhaul.



GRINDING. Track rollers and other rebuilt parts are ground to factory specifications. This grinder, except for the electric motor, was made in the Machine Shop at the Bureau of Yards and Docks' Equipment Repair Depot at McAlester.



SMALL-TOOL SHOP. In this shop at the McAlester Construction Equipment Repair Depot, all types of small tools are reconditioned, sharpened, ground, fitted with new handles, oiled, and crated for shipment.

Navy Repair



Complete Shop for
Thorough Overhaul
Of Construction Equip-
ment Domestic and Foreign



MACHINE SHOP. Below, precision machining built for construction equipment is

BATTERED. A line-up of heavy-duty tractors with bulldozers, which have seen hard service on many construction fronts, awaiting their turn to be rebuilt in the Heavy-Equipment Shop.



TESTING. Rebuilt motors are run in, then assembled on the equipment, and worked from 5 to 8 hours on the tough proving ground at the Oklahoma Repair Depot, shown below. This is probably the most-moved dirt in Oklahoma.



What We Can Do For You

SHOP. The section of the Heavy-
ment Repair Shop shown
machining built parts for heavy-duty
instruction ment is done.



CLEANING. One of four steam cleaning stations convenient to the various shops where all equipment is thoroughly cleaned before inspection and overhaul. The use of "critical" gasoline for cleaning has been almost entirely eliminated at this Oklahoma Repair Depot.



"BUILDER-UPPER." A welder builds up a shaft from the crawler assembly of a dragline, using a welding jig and turning wheel made at the Bureau of Yards and Docks' Repair Depot at McAlester.



WAITING. Many makes and models of dirt-moving scrapers stored in the Bureau of Yards and Docks' Repair Depot yard, prior to being dispatched to the shop for overhaul.



LOADING. Below, a carload of reconditioned construction equipment being blocked on railroad flat cars, in preparation for shipment from the Bureau of Yards and Docks' Repair Shops at McAlester, Okla., to a Navy Advance Base Depot.



READY TO GO. A shipment of earth-hauling units completely overhauled at the Bureau of Yards and Docks' Construction Equipment Repair Depot at McAlester and ready for strenuous service again.

Hoosier Roadsides, Parks and Prospects

Acquisition of Sites for Turnouts
And Small Roadside Parks Continues
In Preparation for Post-War Travel

★ NO post-war project is better than the plans that are ready for execution, and "plans" implies that right-of-way is already purchased for the project. Indiana has recently purchased several small plots for roadside parks, well within the 3-acre limit set by law. The development of these will provide many valuable post-war projects, while today the existing parks are being maintained in as economical a manner as possible to prevent deterioration by erosion or just lack of maintenance.

Roadside Parks

The state law under which roadside parks are established in Indiana limits the maximum size of each to 3 acres. It has been the policy of the State Highway Commission to purchase odd tracts which have become isolated from the balance of the property by the relocation of highways.

An example of this is a $\frac{3}{4}$ -acre tract on State Route 37 near Elwood which was purchased for \$150. This particular plot was bought after the relocation had been completed, but the present policy is to buy these odd-shaped plots at the time the right-of-way for the project is acquired. The Elwood plot will be developed later into a roadside park. It is triangular in shape and contains six or eight black walnut trees, some shrubs, and a few saplings which may be removed. The trees are so situated that a turnout can be run through the plot with two or three graveled stalls off the turnout for parking.

While no new parks are being established during the war, a small amount of maintenance work and some maintenance contracts are being performed at existing parks to preserve them and keep them in first-rate condition for the time when motorists will again use them in considerable numbers.

At Monitor Springs Park, 7 miles east of Lafayette, Ind., on State Route 26, there is a 3-acre tract located on two sides of a ravine where there is considerable need for erosion control. Gullies



C. & E. M. Photo
A well-developed roadside rest park with a spring house on State Route 26, about 7 miles east of Lafayette, Indiana.

have washed out a portion of the road to the plateau on one side of the gully, and other gullies have started to wash into adjacent privately owned land. These are being checked by various

means, such as planting, packing the gullies with brush, and in one case the erection of a rubble wall to support the rebuilt roadway. This park has an excellent spring located in a limestone shelter

with both running water and a bubbler. Part way up the slope, on the opposite side of the ravine from the spring, are sanitary facilities, while in the ravine is a dense growth of trees and shrubs, and single trees on the plateau areas above. Group planting has been done for extension of shade as the trees develop. There are three field stoves in this area at present, and three more are to be installed as they become available.

Each of the roadside parks and turnouts is equipped with one or more rustic tables of simple but attractive design, built to withstand hard usage and weathering. They are made at the State Penal Farm for the State Highway Commission and delivered ready for installation. Each autumn the tables are removed and taken to the sub-district garages, where they are refinished by scraping any damaged portions and given a heavy coat of spar varnish, any material damage repaired, and then they are stored at the garages until it is time to put them out in the spring.

(Concluded on page 60)



WHY Form-Set Purple Strand is still hard to get

No need to tell wire rope users that wire rope is hard to get.

You've been telling us!

But perhaps you'd like to know why, when consumers of some other products are looking toward easing of restrictions, wire rope is still tight. Here are some of the reasons:

The shipbuilding program, with its emphasis on landing craft, will continue to make heavy inroads on wire-rope production. And so, of course, will the year's stepped-up military and naval operations. Further, the country's 1944 oil program contemplates an increase of from 18,000 to 24,000 wells — and for

wells so much deeper than ever before that oil-country demands for wire rope will leap upward from 80 to 100%.

We therefore make this suggestion: Figure your wire rope needs (and place your orders) as far in advance as possible. This offers the best assurance that the wire rope you are going to need through the year will be on hand when you need it.

And while you're thinking about wire rope, think of Form-Set Purple Strand.

"Purple Strand" means that the rope is made of "Improved Plow" steel, the strongest, toughest steel used in wire-rope manufacture.

"Form-Set" means that the wire rope is preformed, making it not only rugged but far easier to handle. Preformed wire rope gives longer service because it is much better able to stand bending fatigue.

Form-Set Purple Strand is Bethlehem's top-quality wire rope. It is made in all sizes and constructions. For the utmost in flexibility and ruggedness, and long service life, call for Form-Set Purple Strand.



PROTECT
WITH
Fultex
TARPAULINS
WIND BREAKS

Fultex waterproof covers give economical protection—one of the most widely used, serviceable covers on the market. Recommended for heavy duty and long wear at low cost.

Quick delivery from stock on standard size covers.

FULTON BAG & COTTON MILLS

Manufacturers since 1870

Atlanta, St. Louis, Dallas, Minneapolis,
New York, New Orleans, Kansas City, Kan.

Care and Repair Tips For Track-Laying Wheels

A handy booklet on the care and repair of Athey Forged-Trak wheels is ready for distribution to aid in keeping Athey equipment in service for the duration. Periodical inspection, which will bring to light loose spindle nuts and track-plate bolts and small breaks in rocker beams, is recommended. The importance of lubrication is also stressed,

with the suggestion that a lubrication chart be kept for each piece of machinery. The book includes instructions for the rebuilding by arc welding of track rail, track hooks, rocker beams, and other wheel parts, with specific recommendations for the size of welding rod to be used and the procedure to be followed in each case. The text is well illustrated with close-up photographs of the equipment under discussion.

Copies of the booklet, "Care and Re-

pair Tips", will be sent upon request by the Athey Truss Wheel Co., 5631 W. 65th St., Chicago, Ill. Just mention this item.

New Catalog Describes Line of Lifting Jacks

An attractive catalog, varnished to withstand hard usage, has just been released by the Duff-Norton Mfg. Co., describing the lifting, lowering, pushing

and pulling jacks which it is manufacturing under present wartime restrictions. This is a complete line, according to the company, with a wide variety of types and sizes to suit every need. The book is well illustrated with photographs, some of them full-page size showing various types of jack in actual operation.

Copies of this Catalog 202 may be secured from the Duff-Norton Mfg. Co., P. O. Box 1889, Pittsburgh, Pa., by mentioning this publication.

"TOUGHEST MOTOR GRADER ON EARTH!"



• Heavy rains and flooded roads during the pursuit of Rommel in Libya could not stop these "Caterpillar" Diesel Motor Graders, needed for leveling airfields.



• (Upper view) A fleet of "Caterpillar" Diesel Motor Graders at work on a big landing field for Allied planes in the North African war zone.

• (Bottom) In New Guinea, this "Caterpillar" Diesel Tractor with sheep's-foot roller and "Caterpillar" Diesel Motor Grader build a new air strip.

"Toughest motor grader on earth!" . . . That's the way contractors and county officials have always talked about their "Caterpillar" Diesel Motor Graders. That's the way men in the armed forces talk about them today. For these rugged machines have proved themselves as versatile and dependable on the battle fronts as they ever did on construction and maintenance jobs at home.

"Caterpillar" is building them now at the greatest production rate in history. But motor graders are so vitally needed by fighting men that only a small fraction of the increased output can be spared for use elsewhere. And those few machines are allocated by the War Production Board to purchasers in war-essential work.

If it comes to a choice between repairing your local roads or rushing through an emergency landing field for hard-pressed Yank airmen, there can be no argument. We've got to win the war.

However, there's a brighter side. This same huge "Caterpillar" production will be available for civilian needs as soon as war and government regulations permit. There'll be no time out for retooling. The machines you get will be war-tested — up to the minute in every detail. They'll have the same unfailing power and traction, same ease of handling, same wide range of blade positions that have always made "Caterpillar" Diesel Motor Graders first choice.

In the meantime, many who need "Caterpillar" Diesel Motor Graders must wait for peace. Do your best to keep your present equipment going. Enlist the "Fighting Four" (Inspect, Lubricate, Adjust and Replace) for the duration. And if you reach the point where you must have a new machine, talk to your "Caterpillar" dealer. He will gladly explain how you can apply for it.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

CATERPILLAR DIESEL

TO WIN THE WAR: WORK—FIGHT—BUY U. S. WAR BONDS!

Interregional System Will Aid City Problem

(Continued from page 37)

heart of the city. Along the railroads the city's industrial plants are located. The newer ones, such as the large war industries, are often found far out in the environs.

While every city contains some admirable features and thoroughly satisfactory parts, rapid expansion and virtual transformation in recent years have produced an unbalanced condition fraught with great economic difficulties. Few cities have managed to grapple successfully with the situation. In nearly all cities great efforts are being made today to restrain excessive decentralization and to rehabilitate slum and blighted areas.

Selection of Routes in Cities

While the selection of routes for inclusion in the Interregional System within and in the vicinity of cities is properly a matter for local study and determination, the Committee suggests the following principles as guides for local action, which it suggests being taken by state, county, and municipal governments in cooperation.

For the service of interregional traffic and other traffic bound in and out of the city to and from exterior points, the problem is one of convenient collection and delivery. The state highway department should have the primary responsibility of determining the detailed location of routes leading to the city, as it will have the essential knowledge of origins and destinations of the traffic moving on the adjacent rural sections of the routes.

Once the routes enter the environs of the city, however, they become a part of the sum total of urban transportation facilities, and as such must bear a proper relation in location and character to other parts of the street system. In addition to the traffic to and from exterior points, they will carry a heavy flow of intra-urban movement of which city authorities will have knowledge or which they will be best able to measure or predict.

On the basis of the 1940 census, the Bureau of Census defined a certain area in connection with each city of 50,000 or more population as a metropolitan district, except that two or more such cities were sometimes included in one district. The number of such metropolitan districts totals 140. The general plan was to include in each district, in addition to the central city or cities, all adjacent and contiguous minor civil divisions or incorporated places having a population of 150 or more per square mile. In some districts, a few less densely populated divisions were included on the basis of special qualifications.

In such metropolitan districts, cooperation between the state highway department and local authorities will be essential, but will be complicated by the fact that the metropolitan area consists of several cities or towns and perhaps one or more county jurisdictions and that decisions will need to be reached on a metropolitan rather than a city-by-city basis. Recognizing the difficulty of unifying a multiplicity of local agencies, the Committee believes that the creation of an overall authority would be highly beneficial and desirable in complex urban areas. Only through some such overall agency can there be developed an adequate thoroughfare plan to provide for all traffic needs. The interregional routes should be coordinated with the metropolitan street and highway plan. Such a metropolitan authority could anticipate and avoid obvious mistakes in the location of the interregional routes, prevent distortions in the devel-



Diagram showing the manner of growth of the populated area of Baltimore, Md., along the main highways. This is typical of the development of most American cities.

opment of the area as a result of short-sighted compromises, and in the long run lead to the best solution for all concerned.

The By-Pass Is Not the Answer

Because of the traffic congestion encountered in passing through cities, it is the usual conclusion of those who make long automobile trips that they could save much time and avoid annoyance if so-called by-pass routes were available to carry them around all cities. Comparative travel-time studies usually con-

firm this impression.

Such a study at Lafayette, Ind., for example, showed that the average time required to travel 6 miles through the city between two points on U. S. 52 was 14 minutes. To travel between the same two points over 6.67 miles of existing roads around the city required an average of 9 minutes.

Another example is afforded by a recently constructed 9.5-mile route around Newport News, Va., from the James River Bridge to Fort Monroe. At 35 miles an hour this by-pass can easily be

traveled in 16 minutes. The old route through the city was 11.2 miles and required a minimum of eight stops. Travel time in off-peak hours averaged 29 minutes and during rush hours was considerably longer. The new route, therefore, saves at least 13 minutes and avoids the necessity of frequent stops and starts.

By such actual time studies it is demonstrated that through travel would be saved time and annoyance and much of the cost of stopping and starting at numerous street intersections if convenient routes were provided around all cities. Such routes undoubtedly have a proper place in a well designed system of traffic arteries for any city.

But the common impression that provision of such routes would constitute invariably a complete, or even a substantially adequate, solution of the highway problem at cities is not well founded. It is a fallacious conception of the need for adequate accommodation of the traffic moving over the rural high-

(Continued on next page)



LCM (Landing Craft Mechanized) 50 ft.



LCI (Landing Craft Infantry) 157 ft.

LST (Landing Ship Tanks) 328 ft.

KEEP AMERICA STRONG
BUY MORE WAR BONDS

Selection of Routes For Traffic in Cities

(Continued from preceding page)

ways. From the standpoint of the cities, it fails as a solution of the most serious aspects of the problem. The root of the fallacy, so far as the rural highways are concerned, lies in the fact that on main highways at the approaches to any city, especially the larger ones, a very large part of the traffic originates in or is destined to the city itself. It cannot be by-passed.

A diagram made in 1932 showing the volume and destinations of traffic approaching Baltimore, Md., on the Washington Boulevard, U. S. 1, shows that, of a total of 5,874 vehicles approaching that city, 717 moved to its center as their ultimate destination. Others, numbering 726, 398, 113, and 163, respectively, proceeded to ultimate destinations in the

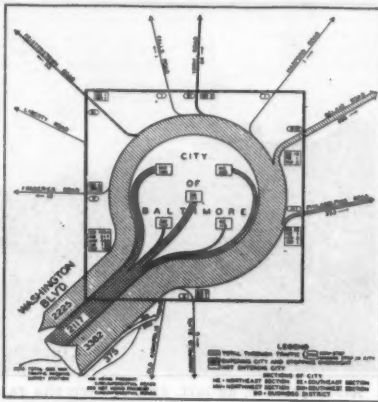


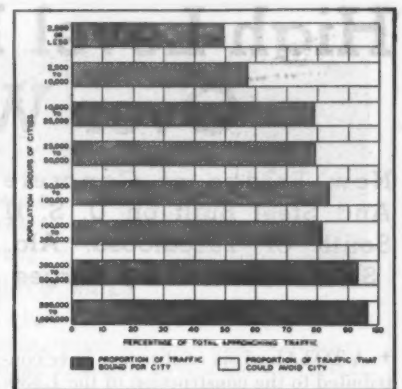
Diagram of volume and destinations of traffic to Baltimore on U. S. 1.

northwest, northeast, southeast, and southwest quarters of the city. A large number, 2,225 vehicles, went to points within the city, largely in the central portion, and returned the same day by the way they had come. Seventy-one vehicles, bound to points beyond Balti-

more, made stops in the city before proceeding to their ultimate destinations, and the remainder, totaling 1,157, or 21 per cent of the city-entering traffic, passed through the city and emerged by several other main highways en route to destinations beyond the city. Similar studies, made at the same time on the other main routes approaching Baltimore, showed a similar distribution of the entering traffic.

These conditions are typical of the conditions at all large cities. On all main highways approaching such cities, a very large proportion of the traffic will be found, upon investigation, to have originated in or to be bound to the city as its ultimate or intermediate objective. In general, the larger the city, the larger is the proportion of the traffic on the main approach highways that is thus essentially concerned with the city.

As evidence supporting this generalization, reference is made to the graph on this page showing two divisions of the total traffic on roads approaching representative cities of various population



Graph showing division of the total traffic on roads approaching representative cities of various population groups.

groups. The origin-destination studies on which this is based were made at 27 cities of various population classes, from six of less than 2,500 persons to one of a population between 500,000 and 1,000,000, persons. As will be observed, the studies made at three cities of 300,000 or more population show that upward of 90 per cent of the traffic moving toward these cities on main approach highways consisted of vehicles bound to ultimate or intermediate destinations within the cities themselves. For the four cities of 50,000 to 300,000 population, the similar proportion of city-bound traffic was found to be above 80 per cent. For the smaller cities, the corresponding proportion tends to decline, reaching 50 per cent for the cities of less than 2,500 population that were studied.

The proportion of adjacent main-highway traffic generated by the smaller cities, either as points of origin or points of destination, depends a great deal upon the location of the city in relation to cities of larger population. A town of 2,800 population, such as Laurel, Md., located on the main highway midway between two such large cities as Baltimore and Washington, which are separated by only 30 miles, will be neither the origin nor the destination of a large part of the heavy traffic counted on the main highway near its boundaries. In contrast, a town of approximately the same size, such as Carson City, Nev., will be found to be the source or destination of a larger part of the lighter traffic on the highway connecting it with its somewhat larger neighbor, Reno.

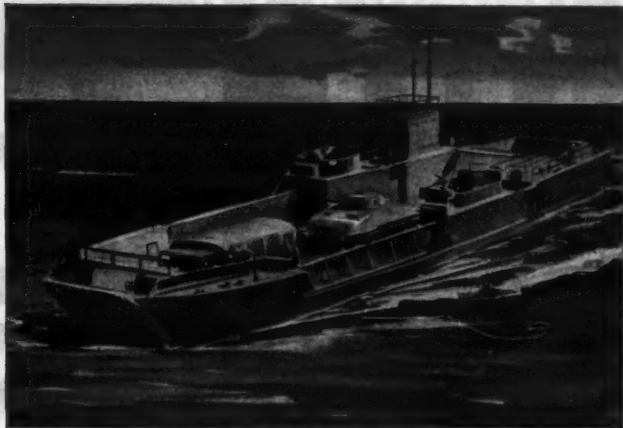
Among the smaller cities, differences of geographic location and inter-city relationships may somewhat disturb the rule. It nevertheless remains true, and among larger cities almost without exception, that the larger the city the larger will be the share of the traffic on the approach highways with its origin or destination in the city.

Business Center Traffic

Furthermore, of this city-concerned traffic, the largest single element originates in or is destined to the business center of the city. This is the area in which are located the larger stores and warehouses, both wholesale and retail, the principal banks and other financial institutions, the seat of the city government and the courts, the bigger hotels and theatres, some of the larger apartment houses, and the more influential churches. Usually it includes the principal transportation terminals, some industrial establishments, and occasionally one or more high schools and other educational institutions, the art gallery and music hall and other cultural institutions. Generally it is also the site of the original settlement of the city.

The locations of the principal rail and water terminals have been powerful factors in shaping the business center. Within the foreseeable future, this area is likely to remain objective and the source of a large part of the daily street and highway traffic. It is reasonable to conclude, therefore, that the inter-

(Continued on page 52)



LCT (Landing Craft Tanks) 105 ft.



LCVP (Landing Craft Vehicle Personnel) 36 ft.

AMERICA'S FIGHTERS MOVE IN —WITH GM DIESELS

In the face of enemy fire these remarkable invasion boats nose in on enemy shores and pour out America's tough fighters and fighting equipment.

They move on split-second orders—must get in and out again by themselves—on the dot, come hell or high water.

It's the kind of service that calls for utmost reliability and quick response.

In these capable craft—from the 36-foot LCVP to the big 328-foot LST—you find the engines America and our Allies know so well, General Motors Diesels.

To these engines are assigned the jobs that call for the greatest dependability the engine world knows.



ENGINES . . . 15 to 250 H.P. . . . DETROIT DIESEL ENGINE DIVISION, Detroit, Mich.
Engines of this series power the LCI and all the smaller landing craft.

LOCOMOTIVES ELECTRO-MOTIVE DIVISION, La Grange, Ill.
Engines from this Division propel the giant LST vessels.

ENGINES . . . 150 to 2000 H.P. . . . CLEVELAND DIESEL ENGINE DIVISION, Cleveland, Ohio.
More than 40 types of Navy vessels are powered by engines of this Division.

High-Level Bridge Over Warrior River

**New Bridge of Concrete
And Steel Built on U. S. 11
South of Tuscaloosa, Ala.;
Steel Delivered by Barges**

(Photos on pages 1 and 80)

★ A TOTAL of six contractors have contributed to the construction of the 1,330-foot concrete and steel girder-span bridge carrying U. S. 11 across the Black Warrior River 8.4 miles south of Tuscaloosa, Ala. The credit for this new high-level crossing, known as the Foster's Ferry Bridge, goes to the Alabama Highway Department for design; to Division 3 for supervision of construction; to Forcum-James of Dyersburg, Tenn., for the substructure and relief bridges; to Virginia Bridge Co., Birmingham, Ala., Division, for the steel superstructure; to Milam Construction Co. of Birmingham, Ala., for the concrete deck; to R. T. Smith, Inc., Atlanta, Ga., for approach fills; and to B. B. Ethridge, Gantt, Ala., for the removal of structures along the roadway approaches.

Design Features

The river bridge consists of eleven piers and two abutments with piers 7 and 8 in the Black Warrior River. The maximum height of the river piers from the bottom of the footing to the top of the caps is 124.03 feet and 130.03 feet. The spans, all continuous plate girders in 3-span units, starting from the Tuscaloosa, or north, end are: 88 feet 3 inches, 86 feet, 86 feet 9½ inches, 86 feet 9½ inches, 86 feet, 86 feet 9½ inches, 140 feet 8½ inches, 210 feet, 140 feet 8½ inches, 105 feet 9½ inches, 105 feet and 107 feet 3 inches.

For identification the piers are numbered from 1 to 11 from the Tuscaloosa end. Piers 6 to 11 inclusive have web walls from about ground or low-water level between the columns, while piers 1 to 5 inclusive are composed of two columns with a tie beam and concrete caps. The steel plate girders carry a 24-foot roadway comprised of a 7-inch reinforced-concrete slab with a curb 11 inches high and 18 inches wide at either side. There is no regular sidewalk provided.

Handling the Steel

The steel plate girders, of which there are four to each span, were fabricated at the Birmingham plant of the Virginia Bridge Co., delivered by railroad a distance of 14 miles to Birminghamport on the

Black Warrior River, loaded on barges, and towed to the bridge site. The steel for the south end, spans 12, 11, 10 and 9, was unloaded on the south bank and hauled up the steep slope on a car running on a pair of tracks. Hauling was done by a gasoline-powered winch. Steel for the north end, spans 1, 2, 3, 4, 5, 6 and 7, was unloaded on the north bank and hauled up the bank on a track in a similar fashion. The four girders for span 11 were placed by a guyed derrick, while spans 1, 2, 3, 4, 5, 6 and 7 from the north abutment were placed by a 35-ton crawler crane. The girders in all other spans were placed by travelers moved forward on the girders as they were set.

In spans 7 and 9, as shown in one of the illustrations, a group of foundation



River piers 8, at left, and 7, with the falsework for span 9. The two travelers erected the girders for four spans.

piles was driven adjacent to the north and south banks of the river to support single bents of falsework. Sections of the continuous girders were erected from piers 6 and 9 to the falsework bents, and from the latter over piers 7 and 8, leaving a center section of 105 feet over the river, which was placed by two travelers,

one at each end of the gap, which picked up the girders from a barge on the river and placed them directly in the span.

Quantities and Bids

The total quantities involved in the construction of the Foster's Ferry Bridge

(Concluded on page 59)

LIMITED NUMBER OF
HERCULES
TEN GAUGE BODIES
PRE-WAR DESIGN
and CONSTRUCTION
NOW
RELEASED

For IMMEDIATE SALE and DELIVERY!

WIRE OR WRITE US AT ONCE
REGARDING YOUR REQUIREMENTS
and refer to this advertisement

Hercules Steel Products Co.
GALION, OHIO

PILE HAMMERS
and
EXTRACTORS
HOISTS-DERRICKS
WHIRLERS

•
Special Equipment
Movable Bridge Machinery
•

Write for descriptive catalogs.

McKIERNAN-TERRY CORP.
19 Park Row, New York

Distributors in Principal Cities

Surplus Equipment; Its Post-War Disposal

(Continued from page 16)

equipment or even with Federally owned equipment that may be released after the war.

Do We Want the Surplus Equipment?

A very definite negative answer to this question was delivered in the form of a resolution by a group of maintenance and equipment engineers representing the states in the Mississippi Valley Conference of State Highway Officials. The resolution, read by Hal G. Sours, Director of Highways of Ohio, at the ARBA meeting, clearly states that equipment overseas should be left there and that new equipment should be returned to the manufacturers for them to release slowly through the regular trade channels. State highway officials at both the Mississippi Valley Conference and at the ARBA meeting stated frequently that they are in favor of accepting no surplus equipment from the Federal government. Such equipment is already obsolete and generally worn out, requires expensive overhaul and is costly to operate. The outstanding example of this is the great number of Liberty trucks which states received after the last war. These trucks had to be overhauled, never pulled as big a load as the 1½-ton trucks that came out after the war, and cost much more to operate per mile. They proved to be a millstone about the necks of the highway departments, preventing them from buying more economical modern equipment for many years. If politicians will keep their fingers out of the pie and if the public is properly educated, then the state and local highway departments may have their way and be free to choose only such pieces of used equipment as they feel can be purchased from the Federal government at a sufficient price differential to make an investment in used equipment economical.

If the surplus equipment is dumped on the market or is given free to highway departments, it will result in an almost complete stoppage of the sale of new construction equipment made by manufacturers who have expanded their facilities to supply the armed forces and are therefore employing larger numbers of trained men and women than before the war. If there is no market for their products in the civilian economy, there will be a large volume of unemployment at once and a disruption of the orderly manufacture of equipment so that when there is an increased demand a few years later, as the construction market develops, manufacturers will not be in a position to re-expand as quickly as might be desired. Thus, for the sake of the national economy, there should be no dumping of surplus equipment into the laps of state and local highway departments who do not want it.

Can We Get New Machines?

If all used surplus equipment is going to stay overseas and there is to be a dearth of second-hand equipment worth using in this country, this question may well be raised. Contractors and others will want new equipment. Will the manufacturers be in a position to produce all the new equipment required after the war for a huge highway and private construction program? That question was laid in the dust and buried by a careful survey conducted by E. R. Galvin, President, Manufacturers' Division of the ARBA. The following table shows the number of manufacturers who reported, in person, the type of equipment and the production they can handle in 1945 (provided the war is over and they are not further restricted by government orders) in terms of 1939 production. They reported that all companies can convert

NEW EQUIPMENT WHICH MANUFACTURERS COULD PRODUCE FOR PEACETIME USE IN 1945

No. of Mfrs. Reporting	Equipment Made	1945 Production in Multiples of 1939 Production
2	Air compressors and tools	3½
1	Bituminous distributors	3
3	Bulldozers	5
2	Concrete finishing machines	2
1	Crushers and screening plants	3
2	Ditchers	4
6	Earth hauling equipment	3½
3	Electric plants, portable	3
4	Engines, diesel	3
2	Engines, gas	3
3	Graders, all types	3
2	Hoists and dump bodies	4
1	Pavers, bituminous	4
3	Pavers, mixers, and truck mixers, concrete	2
1	Pumps, water	2
1	Road forms, bins, batchers	2
1	Rollers, road	3
1	Rubber tires	2½
2	Sawyers	5
6	Shovels, cranes, draglines	2½
2	Tanks for truck mounting	4
4	Tractors, crawler	3
2	Tractors, wheel, industrial	10
2	Winches, truck-mounted	3½
3	Wrecker cranes, truck-mounted	5

In addition, representatives of the portland cement industry and of the bituminous paving materials group reported that there would be ample supplies of these materials for any possible needs.

to peacetime production just as fast as sales can be diverted from government to regular channels. There is no reconversion problem, as our standard con-

(Continued on page 72)



LOOKING
AHEAD?
Include
TUTHILL GUARD RAILS
in Your Plans

HIGHWAY ENGINEERS are now making plans for their post-war safety program. Many of them, knowing by reputation and service the TUTHILL GUARD RAIL, are including it in their post-war specifications.

Unique in its convex design and spring-like deflective action, substantial, strong and attractive, easy to install and maintain, TUTHILL is the logical Guard Rail to specify now for use later.

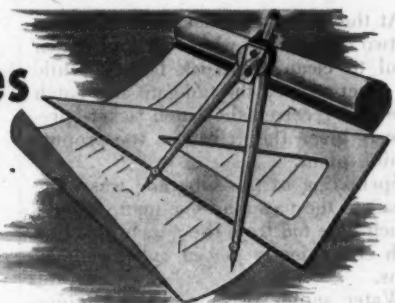
Pacific Coast Manufacturers and Distributors
U.S. SPRING & BUMPER CO., LOS ANGELES, CAL.

Write for
detailed
specifications.

TUTHILL SPRING COMPANY
762 POLK ST... CHICAGO 7, ILL.



JAEGER offers these figures to POST-WAR PLANNERS

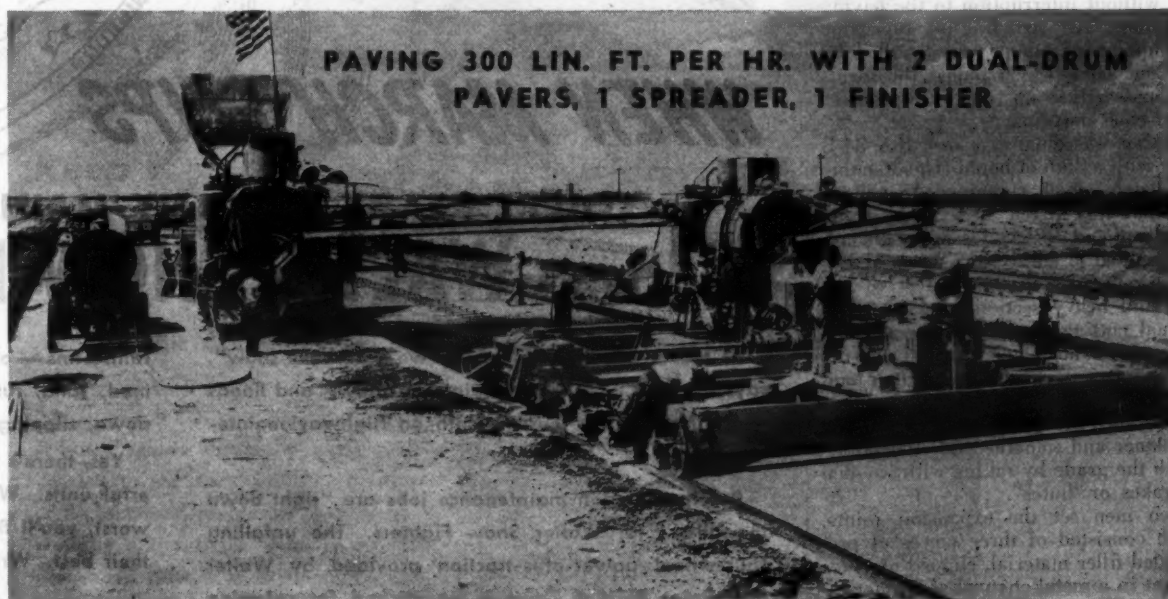


Compared with the last World War year of 1918, the placing and finishing of concrete highways and airports is now being accomplished 6 to 10 times faster and at approximately one half the cost per yard.

This progress, already achieved to meet war-time schedules, is directly due to the development by the paver industry of the dual drum paver and

the development, by Jaeger-Lakewood, of the mechanical concrete spreader and finisher—the team that broke the bottleneck behind the paver.

Planners of post-war projects and contractors who will build them will both be interested in the comparative figures offered below:



PAVING 300 LIN. FT. PER HR. WITH 2 DUAL-DRUM PAVERS, 1 SPREADER, 1 FINISHER

HIGH PRODUCTION: In 1918 an hourly rate of 40 lin. ft. of 18 ft. slab (80 sq. yds.) was fast work for a paver and Lake-wood Finisher.

Today, runs of 300 ft. of 25 ft. slab (833 sq. yds.) per hour are being made by using two 34E dual drum pavers followed by one Jaeger Screw Spreader and one Jaeger-Lakewood Type "H" Finisher. On an Ohio glider base the pace of 314 ft. per hour was maintained for 17 hours, resulting in a single day's production of 5335 ft. of 25 ft. wide slab.

LONG LIFE: In 1918, from 30 to 40 miles of work were out a finisher. Today's machine can do 150 to 200 miles in spite of much drier, harsher material, do 1,000,000 sq. yds. with the first set of screed shoes.

LOW COSTS: Comparing equipment

costs, a contractor today can buy one 34E dual drum paver, Jaeger Finisher and Spreader for the price of two 1918 pavers and finishers and, with this single outfit, do 3 times the day's yardage possible with two 1918 outfits and crews.

Finally, the cost per sq. yd. of pavement is approximately 50% lower—and the concrete is stronger, denser and far more uniform because mechanical handling permits dry vibratory mixtures and eliminates segregation.

THE JAEGER MACHINE COMPANY
701 Dublin Avenue Columbus 16, Ohio

JAEGER Engineered EQUIPMENT

ALSO "SPEEDLINE" MIXERS, "SURE-PRIME" PUMPS, "DUAL-MIX" TRUCK MIXERS, JAEGER HOISTS, "FLEET-FOOT" CRANE-LOADERS, "AIR-PLUS" PORTABLE COMPRESSORS

New Concrete Paving On Florida-U. S. 441

(Continued from page 21)

and then rolled back into position to protect the cement during hauling. The bottom-dump mechanism on these cement containers, a hinged gate held closed by the batched aggregate, was released automatically when the aggregate was discharged into the paver skip.

The batching plant was operated by a foreman, operators for each piece of equipment noted above, two scale men, one on the aggregate bin and one on the cement plant, two laborers, and a man who wrote and delivered batch tickets to the drivers of the batch trucks.

Hauling was done in a fleet of from twenty to forty 2-batch Ford trucks with Galion Allsteel bodies, depending on the length of haul.

Mixing, Placing and Finishing

At the paver the trucks were dumped by two men, one of whom used a wooden maul to clean the truck bodies, while the other tripped the tail-gate and batch gate and received the batch tickets previously given the drivers at the proportioning plant.

Sprinkling of the subgrade was done ahead of the paver by one man, using a 1-inch hose fed from the 3-inch pipe line with conveniently placed outlet connections.

Water supply was one of the minor worries on this job, which was situated adjacent to several large lakes, and it was never necessary to pump water for any great distance. Two pumps, one a C. H. & E. and the other a Rex, were set side by side with separate suction lines and so arranged that either could be started and its discharge valved into the line in either direction. This arrangement made frequent moves possible without interruption to the paving operations. All stringing of pipe line and moving of pumps was handled by the same crew which pulled the forms and loaded them on trucks for transfer ahead each morning.

Mixing was done in a new Rex 34-E paver with a 35-foot boom. The 36-cubic foot batch, which contained 45 gallons of water, was mixed 36 seconds in the first drum and 30 seconds in the second, and resulted in an average slump of 1½ inches, spread 2.07 linear feet of the wide and heavy section used.

Final cutting of the grade was done by a Cleveland planer, pulled by the paver and equipped with a scratch template as well as a cutting blade. Two men handled the excess dirt picked up by the planer and smoothed any irregularities in the grade by raking with wooden flat rakes or "lutes".

Two men set the expansion joints, which consisted of three pieces of pre-moulded filler material, clipped together and set in a metal channel at 60-foot intervals. Two more men set the non-metallic Keystone fiber center strip, aligning it properly by means of a wooden frame 13 feet long (half the width of the pavement) and 10 feet wide. This frame was placed in position along the inner edge of the steel forms and the center strip staked along its other edge, which was on the true center line of the pavement. Seven pins were used to hold each 10-foot section of center strip in position.

Four puddlers, using square pointed shovels, spread the concrete, followed by the Blaw-Knox double-screed finishing machine. On this job, only the easily adjusted front screed was used on transitions and flattened curves. Behind this machine, two men, working from rolling bridges, set the metal strips used to form the dummy contraction joints at intervals of 20 feet.

A Koehring Longitudinal Finisher

followed this operation immediately, greatly reducing the work done by the two hand finishers, who used both drag and checking straight-edges for the final finish of the riding surface. Two more finishers cut and edged the expansion and contraction joints, passing the metal portions of these joints, when removed from the pavement, to two laborers who carried them ahead to be re-used. The floating and edging along the form line were done by two finishers working from the shoulder.

Center Stripe and Curing

As soon as the finishing operations had been completed satisfactorily, the black-oxide center stripe was applied. Raven Black magnetic oxide of iron was mixed with portland cement in proportions of one part of flake oxide to three parts of cement, with sufficient water to form a rather stiff fluid paste. Two light wooden frames, 11 x 13 feet in size and internally braced, were hooked in position over the steel pavement forms, with

(Concluded on next page)

GEERPRES TANGLEPROOF MOP STICK

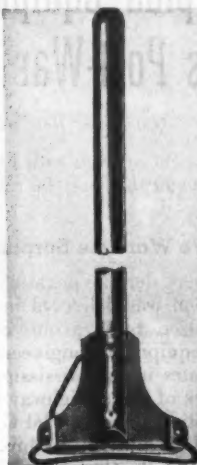
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YOU'RE READY FOR ANY MAINTENANCE JOB WITH WALTER SNOW FIGHTERS

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But these tough maintenance jobs are "right down the alley" for Walter Snow Fighters. The unfailing four-wheel power-plus-traction provided by Walter Four-Point Positive Drive is unmatched for ramming heavy snowdrifts—freeing pavements of hard-packed snow and ice—scraping dirt and gravel roads after

rainstorms—or pulling heavy loads through snow, mud, sand, ruts, or up stiff grades, without bogging down, slipping or stalling.

Yes, there's no "off-season" for these rugged, powerful units. Wherever running conditions are at their worst, you'll find Walter Snow Fighters performing at their best. Write for full details.

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WALTER
SNOW
FIGHTERS

Fla. Center Stripe Broomed on Surface

(Continued from preceding page)

the long dimension parallel to the center line. The sides of these frames which were nearest to the center line had a thin strip of sheet metal extending $\frac{1}{8}$ inch below the frame proper, and when this projection was forced into the still-soft concrete, the two frames formed a trough 4 feet wide, with edges aligned parallel to the center line. On the fresh pavement within this trough the oxide paste was applied, using an ordinary broom, in such quantity that the finished stripe contained 5 to 6 pounds of oxide to each 100 square feet of area covered. After considerable experimentation to ascertain the most successful method of blending the applied paste with the fresh concrete, it was decided that it was best to leave it undisturbed after application. This method results in the formation of a completely black stripe, approximately $\frac{1}{8}$ inch thick, which is an integral part of the finished pavement.

As soon as the oxide stripe had been applied and the frames moved into position for their next use, the entire surface of pavement and stripe was covered with an application of Truscon Tru-Cure. A drum of the curing compound was carried on a rolling bridge, on which was also mounted a small gasoline-powered pump used to deliver the compound, in the form of a fine spray, through a hose and nozzle, onto the finished pavement.

The riding surface was checked the morning after placing by a rolling straight-edge designed by the Division Engineer. It consists of an internally braced wooden frame, 11 feet long and 2 feet wide, mounted on four solid-rubber wheels, with two telltale points, adjustable to keep them in the plane of the wheel bottoms. It has proved very effective in the detection of high spots overlooked during the finishing operations.

After the pavement had cured sufficiently to permit its use, the shoulders were bladed to conform to the typical cross section. Shoulders, slopes, and backslopes were covered with a 4-inch blanket of muck and the entire area sprigged with native sod.

Major Quantities

The major quantities involved in this paving operation were, as follows:

Removal of existing sheet-asphalt pavement	84,626 sq. yds.
Excavation	163,358 cu. yds.
Stabilizing subgrade, 12 inches deep	210,180 sq. yds.
Muck blanket, 4 inches thick	402,800 sq. yds.
Concrete pavement, plain, 8 inches thick	136,362 sq. yds.
Sprigging	401,200 sq. yds.

Personnel

The contract for the construction of 8,939 miles of 8-inch plain-concrete pavement, 26 feet wide, on a roadbed 40 to 46 feet wide, with incidental items, was awarded by the State Road Department of Florida to Ivy H. Smith Co. of Jacksonville, Fla., on its bid of \$653.

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Savannah, Georgia



C. & E. M. Photo

Immediately following the brooming in of the 4-foot wide black-oxide center stripe, the entire slab and stripe were sprayed with curing compound.

187.32. E. D. Fambrough was Superintendent for the contractor, and the work was under the personal supervision of A. S. Cox, Project Engineer, for the state.

Back the Attack! Buy War Bonds!

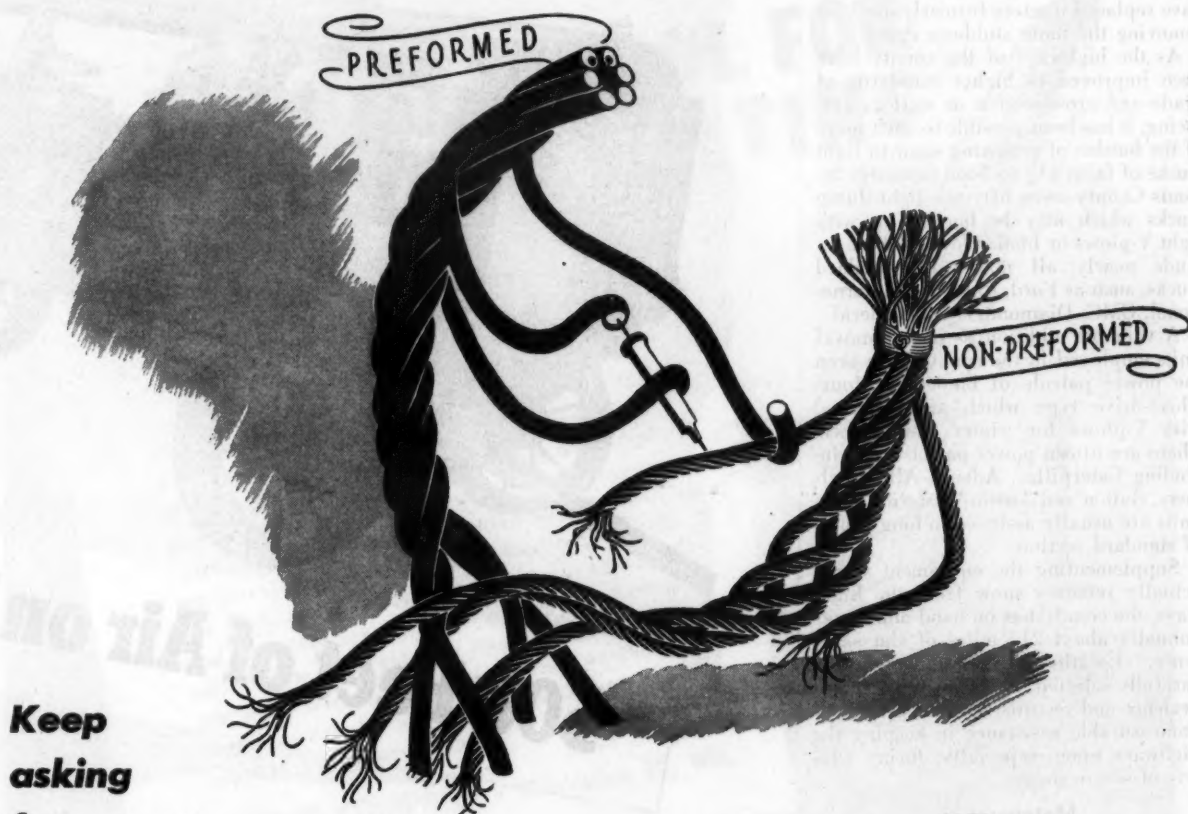
Bending Saves Welding

A right-angle structure of steel can be made by standing one flat plate on another flat plate and welding the junction. It can also be made by bending a

flat plate into a right angle. The latter method was adopted in the production of gear cases for 226 new Victory ships, by engineers of Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. This change has eliminated 50 miles of welding from the standard 8,500-hp gear case. In addition, it has saved 180,000 man-hours of skilled welders' time and 360,000 pounds of welding rod steel—a critical material.

Goodrich Distributor For Punch-Lok Clamp

National distribution rights of the Punch-Lok hose clamp, and the method of applying it, have been granted to the Industrial Products Sales Division of B. F. Goodrich Co., according to an announcement just made. The clamp, made by Punch-Lok Co., Chicago, Ill., is a locking device used to connect various kinds of male and female fittings, special nipples, menders, or ordinary pipe to hose, electric cable, and wire or textile rope.



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No wonder
the Armed
Forces take
so much of our
production!

County Maintenance In Wartime Winters

(Continued from page 12)

and serviced in preparation for the task.

Snow-Removal Equipment

St. Louis County snow-removal equipment is of two general types: trucks with plows, and power patrol graders with plows. These types of equipment have been selected not only because they are efficient, but because they are useful in the maintenance program during the entire year.

Included in the truck roster are thirty-four all-wheel-drive trucks of 5 to 8-ton capacity, equipped with hydraulic plows and wings. These include FWD, Oshkosh, Marmon-Herrington, Walter and Autocar trucks. In addition, there are two heavy-duty trucks for extremely difficult plowing conditions, a 12-ton Walter and a 15-ton Oshkosh. These units have replaced tractors formerly used for removing the more stubborn drifts.

As the highways of the county have been improved to higher standards of grade and cross-section as well as surfacing, it has been possible to shift more of the burden of removing snow to light trucks of from 1½ to 3-ton capacity. St. Louis County owns fifty-one light dump trucks which may be hooked up with light V-plows or blade plows. These include nearly all makes of standard trucks, such as Ford, Chevrolet, International, GMC, Diamond T, and Federal.

A valuable addition to snow-removal units employed in the county have been the power patrols of tandem or four-wheel-drive type which are equipped with V-plows for winter maintenance. There are fifteen power patrols used, including Caterpillar, Adams, Allis-Chalmers, Galion and Austin-Western. These units are usually assigned to long routes of standard section.

Supplementing the equipment which actually removes snow from the highways, the county has on hand and erects annually about 214 miles of slat snow fence. Location of the snow fence is carefully selected, based on years of experience and records, and has proved of immeasurable assistance in keeping the highways open, especially during winters of severe storms.

Maintenance

The county has seven main garages located throughout the county which have complete facilities for servicing and repairing equipment. In addition to these seven main garages, there are eighteen patrol garages which accommodate at least two snow-plow units and which have facilities for simple servicing and minor repairing.

Each patrol section of about 75 miles is assigned one heavy-duty snow-plow unit and one light truck and blade. The light truck with blade is a high-speed unit and is capable of easily handling light snows over the entire section within a short time. The heavy-duty unit may be used to remove packed or drifted areas in its own section, or may be called into service in some other section where the need is greater.

During recent years, the county used a good deal of sand treated with calcium chloride (100 pounds per cubic yard of sand) and stockpiled at convenient points along the highways for use during icy weather conditions. It is anticipated that speed restrictions and reduced traffic may curtail this work somewhat.

Snow Removal in Wartime

In considering the snow-removal prob-

lem during wartime, Engineer Deibler had this to say:

"A reduction in traffic, considered solely on that basis, has little or no effect on snow removal because if any traffic must get through it is just as easy to accommodate normal traffic. Obtaining parts and making repairs, together with the limited use of gasoline and diesel fuel, may have a more definite effect in curtailing snow-removal operations

than the reduced traffic. While highway departments are restricted in construction funds, sufficient funds are available for the proper maintenance of the existing highways."

Mr. Deibler suggests that highway engineers in the snow-belt consider the possibility of reducing mileage maintained. He points out that snow removal on rural roads where residents are

(Concluded on page 63)



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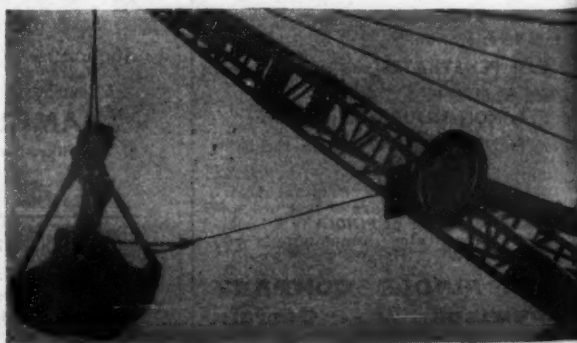
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Tagline is complete with fair lead and cable attached and can be installed in less than one-half hour. Most of the crane manufacturers have adopted the Rud-o-Matic as standard equipment.

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Safety on Highways Now and in Future

Accidents Are Increasing Despite Fewer Cars; Our Post-War Designs Must Be Made for Greater Safety

By SIDNEY J. WILLIAMS, General
Manager, National Safety Council

+ THE arbitrary wartime speed limits, first 40 and then 35 miles an hour, sought to conserve scarce equipment and protect life and property. The general and growing disregard of this low limit reflects our traditional dislike of arbitrary restrictions and also our failure to realize the imperative need for conservation of gasoline and rubber as well as equipment.

Motor-vehicle traffic deaths dropped from 39,969 in 1941 to 28,309 in 1942 and about 23,300 in 1943, due to the decline in travel. The death rate, deaths per 100,000,000 vehicle-miles, decreased 14 per cent in 1942 but increased slightly in 1943. This rate, however, is an inaccurate barometer because two-vehicle collisions tend to vary with the square of the travel. Taking account of this "square factor" and computing a more accurate "exposure rate", we find that this rate went down 7 per cent in 1942 and 5 per cent in the first half of 1943 but went up 15 per cent in the last half of 1943! In October, November and December of 1943 there were actually more persons killed than in the same months of 1942. This completely explodes any popular illusion that wartime restrictions have even temporarily solved the traffic-accident problem.

On the whole, wartime traffic problems have been met with patriotic energy and with characteristic American ingenuity. We might have done much worse, but we need to do much better. The degree of "conservation" which we have achieved would still seem reckless extravagance to our allies. We tolerate unnecessary travel, increasing violation of the wartime speed limit, cheating on gasoline coupons; we kill or injure over a thousand workers every day. It is the responsibility of public officials and leaders of public opinion to arouse the public to a much more realistic understanding that the war is not yet won, that vehicles and gasoline and lives must not be wasted, that not all the sacrifices shall be made at Tarawa or Cassino.

Post-War Problems

Immediate post-war problems will include the subnormal condition of vehicles and tires, which will require months if not years to remedy completely; the subnormal condition of highways due to inadequate maintenance and almost no reconstruction; the decline in the quantity and often the quality of police enforcement, driver licensing, and other preventive activities, all added to the quick increase in miles driven which will surely follow the lifting or relaxing of gas rationing. Speeds undoubtedly will increase even before the 35-mile limit ends; and this may be serious indeed, in view of the deteriorated condition of

both vehicles and highways and the depletion of police forces.

The long-term prospect embraces a great increase in the number of motor vehicles, and many probable changes in the traffic pattern—decentralization of metropolitan areas, and the shifting of industrial, commercial, educational and recreational establishments, all of which can be met only by the most farsighted planning and prompt action on the part of all concerned.

Plan Safety Now

How are we to meet these many and varied problems? By hasty palliatives, born of desperation after the emergency has become acute? God forbid! The wise planning and handling of traffic, as

of many other elements in our joint life, presents as great a challenge as this nation has ever faced, more complex in many ways than the challenge of survival in global war, a challenge which is at the same time the greatest opportunity we have ever had to utilize properly the tremendous productive energies that will be suddenly released.

If we handle traffic wisely, we shall handle it safely; for safety is not a thing in itself, to be added or withheld at will; it is a by-product of efficiency, of doing the thing the right way.

The report of the Committee on Inter-regional Highways, and particularly the design standards in Appendix V, are in my opinion the greatest single contribution ever made to highway safety. Its final consummation runs into billions of dollars, yet practical considerations have not been overlooked; the end is to be reached by many easy steps. That is the essence of all great planning—not to do everything at once, but to do nothing that will have to be undone, to have

everything that is done fit into the final picture.

The interregional standards are based on safe travel at speeds of 50 to 75 miles an hour, depending on terrain. It is to be hoped that this will, once for all, lay the ghost of "100-mile-an-hour highways". We can build, at a price, 100-mile-an-hour highways and 100-mile-an-hour cars, but where are we going to find 100-mile-an-hour drivers? Not enough of them, in our generation at least, to keep the cars and the highways busy.

Accidents Are Symptoms

Intelligent designing, maintenance, signing, policing, and all the other traffic functions are impossible without accident records. An accident is not merely a personal misfortune, it is a symptom of something wrong in the highway or in the traffic on that highway. We need much better accident records, better analysis, and better use of

(Concluded on page 69)

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saves seconds on material handling work. Independent boom control permits accurate handling of piling for high speed pile driving on bridge and building construction projects. Raising or lowering the boom while swinging or traveling is a second-saving feature. Koehring Cranes are high speed, easy handling, have accurate and positive control. The many time-saving advantages of Koehring means speed on the job, more work per shift, less man power... waste motion is reduced to a minimum, every move is a production move.

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HEAVY-DUTY CONSTRUCTION EQUIPMENT

Choosing Right-of-Way To Serve Urban Areas

(Continued from page 45)

gional routes, carrying a substantial part of this traffic, should penetrate within close proximity to the central business area.

How near they should come, how they should pass it or pass through it, and by what courses they should reach it, are matters for particular planning consideration in each city. Since these routes should be designed to serve important arterial flows of intra-urban as well as interurban character, their locations from the fringes to the center of the city should be determined in large degree by the location of internal areas in which are generated important volumes of the intra-urban movement.

The city streets over which the urban mileage included in the recommended Interregional System has been measured are those now marked as the trans-city connections of the existing main rural highways that conform closely to the rural sections of the recommended routes. These streets generally pass through or very close to the existing central business areas of the cities. It is probable that in any development of the interregional routes, the locations chosen will not follow the streets presently used in many cases, but will be based on a study of the mileage with respect to the land uses in the areas that will be traversed, and of the nature of land-acquisition problems involved in the development.

Use of Undeveloped Land

The improvement of highways at urban centers has in the past stimulated outward extension of city growth, and has left wedges of relatively undeveloped land between these ribbons of development along the main highways entering the city. To some extent these wedges are the result of a topography less favorable for development or of the reservation of land for various public uses. In most cases they are caused in part by the lack of satisfactory connections with the city, either by roads of direct entrance or by appropriate transverse connection with the main highways.

Whatever their cause, existing wedges

of vacant land may offer the best possible locations for city-entering routes of the Interregional System. Alignment and right-of-way widths appropriate for the new highways and difficult of acquisition in more developed areas may be obtainable in these vacant spaces with relative ease and at moderately low cost. So placed, the routes may often be extended far into the city before they encounter the greater difficulties of urban location.

In choosing these locations for the arterial routes, however, it should be recognized that the undeveloped lands which lie so favorably for highway purposes also present opportunities equally favorable for other purposes of city planning. In any case, if the new city-entering highways are located through existing wedges of undeveloped lands, they must be connected with well developed existing suburban areas, which are usually located along the present main highways, in order to serve effectively the arterial needs of these communities. Adequate cross highways at suitable points will provide these connections.

Continued around the city, from one new arterial and one existing main highway to another, these connectors become the circumferential routes which are discussed later. Some of these circumferentials, especially those forming the outer belt, may appropriately belong in the Interregional System, as they would serve both to distribute the city-bound interregional traffic around the city to the point nearest its destination, and also to transfer through traffic around the city from one route to another.

It will at once be apparent, however, that if the improvement of main highways in the past has resulted in the stringing out of city growth along them, the superior improvement contemplated for the new arterial routes would have the same effect in exaggerated degree. The improvement of the Interregional System should be so designed as to discourage ribbon development and the unwise subdivision of large tracts of suburban land. Special preventive measures will prove helpful in this connection. One of these measures, applicable at the

appropriate stages of city growth, would be to provide adequate circumferential routes, and then, as the interradial space widens, to add branches to the radial arteries. Another, which involves no principle of route locations, is mentioned here only because of its bearing upon city development. It is the control of limitation of access to the arterial routes.

Unlimited access to the existing main highways has undoubtedly encouraged the outward extension of settlement along them. Per contra, the denial of access to the new arterial highways for a substantial outward distance beyond any desired points on these highways would probably discourage the creeping of settlement along them much beyond the selected points, and this is endorsed by the Committee in principle.

Circumferential Routes

Although a large part of the traffic on interregional routes approaching the larger cities will generally have its origins and destinations in the center of

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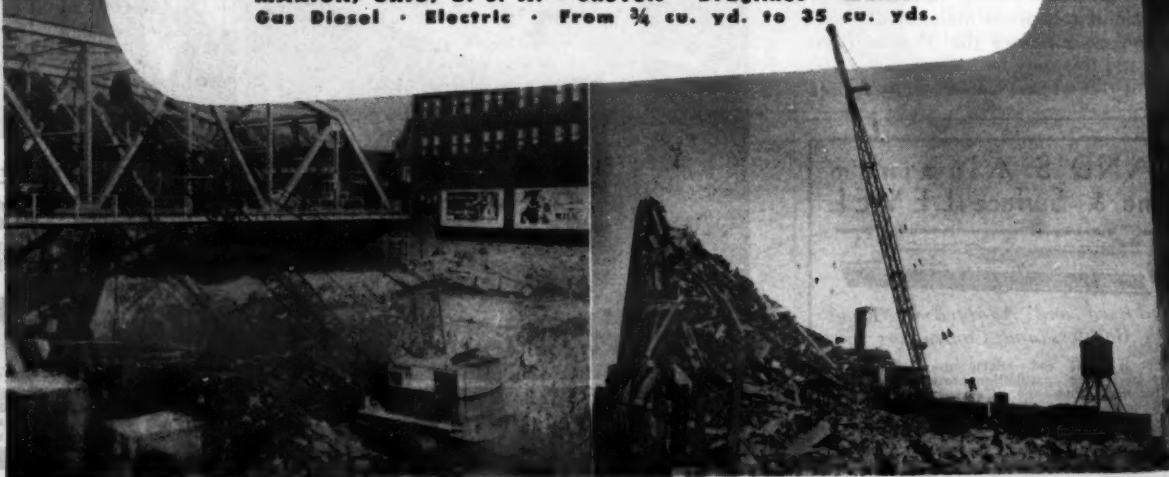
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Routing the Highway Through City Centers

(Continued from preceding page)

the city, substantial fractions will consist of traffic bound to and from other sections. Another portion, its volume depending usually upon the size of the city in relation to the sizes of other nearby cities, will consist of traffic bound past the city.

To serve this traffic bound to or from points other than the center of the city, there is need of routes which avoid the business center. Such routes should generally follow circumferential courses around the city, passing either through adjacent suburban areas or through the outer and less congested sections of the city proper.

Generally, such routes can be so located as to serve both as arteries for the conveyance of through traffic around the city between various approach highways and as distribution routes for the movement of traffic with local origins and destinations to and from various sections of the city. The pattern of such routes will depend upon the topography and plan of each particular city. At most relatively large cities, the need will be for routes completely encircling the city. More than one circumferential route may be needed. A series of them may be provided to form inner and outer belts, some possibly within the city itself, others without. In the largest cities, one such route may be required as a distributor of traffic about the business center. Often, it may be possible to serve this function by suitable locations of several of the main penetrating arteries.

Traffic-Generating Foci

Railway terminals, both passenger and freight, wharves and docks and airports generate large volumes of street and highway traffic. Much of it is of express character, and significant fractions are associated with the essential interchanges between the several modes of transportation. Both passengers and freight are transferred between railroads and ships, and passengers between railways and airlines. The future development of commercial air cargo and express freight transportation should not be underestimated in considering this shuttle movement between transportation media.

The location of the interregional routes at cities, both the city-penetrating main routes and the circumferential or distribution routes, should be so placed as to give convenient express service to these various major traffic-generating foci within and in the environs of the city, and also to the business center of the city, the wholesale produce market, main industrial areas, principal residential sections, new housing developments, and the city parks, stadium, baseball park, and other sports areas.

Location of the routes should be determined in relation to such foci in the

positions where they are planned or are likely to be in the future and not where they are at present, if change is reasonably to be expected. Thus the closest possible cooperation is needed between highway, housing and city planning authorities, railroad, motor bus and truck interests, air transport and airport officials, and any other agencies, groups and interests that may be in a position to exert a determining influence upon the future pattern and development of the city.

Consider Other Transportation

At cities, especially, it is important that the location of interregional routes be so chosen as to permit and encourage a desirable coordination of highway transportation with rail, water and air transportation. Incidentally, opportunities for joint use of new structures by the interregional routes and mainline railroads should not be neglected. The feasibility of combination rail-and-highway tunnels to eliminate the costs of snow removal or protection and to reduce

grades over some western mountain passes should be carefully investigated. It will be desirable to study at numerous points the possibilities of providing in a single structure, whether bridge or tunnel, for the crossing of rivers and other bodies of water by interregional routes and main railway lines.

In many cities the surface location of railways remains as one of the more acute problems facing the city planner. Instead of attacking this problem piecemeal by the elimination of grade crossings one or two at a time, a practice which tends merely to ameliorate a generally unsatisfactory condition, it would be far better if it were dealt with in accordance with a plan for the complete and permanent insulation of the railway. Since the interregional routes and other express highways require, in some degree, a similar insulation, a plan for the common location of the two facilities might offer not only the advantage of a minimum obstruction of cross streets but also a substantial possibility of reducing the total costs of achieving the

two purposes, particularly the right-of-way element of such costs.

Throughways: Grade Separations

The Public Roads Administration's studies of the traffic-discharge capacity of highways have reached the conclusion that a one-way two-lane roadway with no intersections will discharge without unreasonable congestions an hourly traffic of 3,000 vehicles moving at an average speed of 35 miles per hour. With equal congestion but with three traffic lights per mile, each set on a half-minute interval, the hourly discharge is reduced to at best 1,500 vehicles an hour. One or two more traffic lanes would have to be provided to restore the highway to its intersection-free capacity.

Street intersections also involve the hazard of accidents, and it is well known that most accidents on city streets occur at such points. Where traffic volume is great, as it is on arterial streets, reduction of the number of intersections can materially reduce the total of accidents.

(Continued on page 66)

EMERGENCIES REQUIRE QUICK ACTION!



Schramm Compressors furnish air on moment's notice!

Merely by easily moving a Schramm Air Compressor onto the job—and touching a starter button—you get all the compressed air you want—and the emergency job is sped along!

Illustrating the time Schramm was needed to furnish air so that a road atop a busy highway bridge leading to a state capitol could be repaired—quickly!

Schramm met all requirements because it could furnish the necessary air speedily—and the unit was lightweight and com-

pact and thus easily towed about. This represented a big saving in hauling costs—plus plenty of action.

Many features contribute to "air-when-you-want-it" Schramm Compressors: (1) Completely water cooled to provide ideal performance both winter and summer. (2) Seven main bearing supports. (3) Mechanical intake valve. (4) More cylinders and lighter parts. (5) Forced feed lubrication.

If you are not already using a Schramm Air Compressor, it will pay you to write today for illustrated Bulletin 42-PA.



Front End Shovels

For Industrial Tractors

Write for Descriptive Circular

White Mfg. Co.

ELKHART

INDIANA

Indiana Speeds Plans For Post-War Highways

In order to speed up plans for Indiana's post-war highway program, engineers from the district offices were called in to the central office in January to work there until the construction season opens this spring. The State Highway Commission has been handicapped in the preparation of plans because of the man-power shortage, and this move was made to alleviate this condition.

Four of the projects in the post-war program have been announced. They include a Circum-Urban Highway around Indianapolis, the Tri-State Highway in

Lake County, a new highway between Martinsville and Bloomington, and extensive developments in Evansville and Vanderburg County.

International Harvester Creates Motor Truck Div.

A separate motor truck division, to have entire control of design, production and distribution of its trucks, has been announced by the International Harvester Co., Chicago, Ill. It is believed that such a change will be beneficial not only through the improvement of war production but also through increased efficiency in the post-war period.

The new division will be headed by P. V. Moulder, whose jurisdiction will include the motor truck factories at Fort Wayne and Indianapolis, Ind., and Springfield, Ohio; the motor truck engineering department at Ft. Wayne; and all exclusive motor truck sales operations, both wholesale and retail, in the United States, as well as exclusive motor truck dealers. Mr. Moulder will be assisted by W. D. Reese as Manager of Engineering; V. A. Guebard as Manager of Manufacturing; D. A. Conroy as Manager of Supply and Inventory; W. C. Schumacher as Manager of Sales; and Glenn D. Wade as Divisional Controller.

Seven New Catalogs On Materials Handling

A series of seven catalogs describing its complete line of materials-handling equipment is now available from the Willamette Hyster Co. This equipment includes lift trucks, mobile cranes and straddle trucks, which range from 30,000 pounds to 2,000 pounds capacity.

The catalogs, each of which carries on the cover an excellent illustration of the machine described, may be secured upon application to the Willamette Hyster Co., Portland 8, Ore., or Peoria 1, Ill.

Continuous RIBBONS OF RESPONSIBILITY

As the last smooth run is being completed by a Foote Adnun paver, two shiny black continuous ribbons appear briefly—a trademark to signal the completion of the job. It is almost as if the machine itself were saying: "There you are boys, smoothly finished!"

These ribbons actually are the marks of the two rear rollers, that appear only after the mix has been put down with a paperlike smoothness and finish. They disappear completely with rolling.

It is important to note that Adnun rollers *do* run on the finished surface, because it is this feature of Foote design which provides a smoother finish. We call it "Continuous Course Correction."

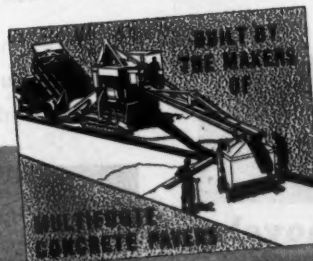
Note in the two diagrams how the Adnun wheels and rollers reduce irregularities to insignificance. A large movement at the wheels is changed into a very small one at the cutter bar. With each successive course, the smoother the surface becomes.

Identify Adnun quality performance by these marks of a smooth job. Continuous Course Correction produces a smooth surface whether the machine is laying Black Top, or crushed rock, slag, or gravel.

THE FOOTE CO. INC. NUNDA, N. Y.

ADNUN
BLACK TOP PAYER

WITH CONTINUOUS COURSE CORRECTION



Drawings show how even a big movement of the wheel is smoothed out at points X on first course and XI on second course.



Post-War Problems Discussed by ARBA

(Continued from page 15)

shake them out of their lethargy. At luncheon on the second day of the meeting, Paul G. Hoffman, Chairman, Committee for Economic Development, and President of the Studebaker Corp., clearly defined the work of the CED in its endeavor to stimulate post-war planning in every business in this country, from the very smallest to the very largest. Mr. Hoffman pointed out that the Committee, through its research division, is offering a great variety of assistance to any small manufacturer or business man in getting his planning started.

The afternoon session of that day was devoted to a free and frank panel discussion of the disposition of surplus war equipment, including construction machinery. Claude Heacock, Chairman of the Executive Committee, Caterpillar Tractor Co., presided and stimulated much discussion and questioning. The panel consisted of E. I. King, Property Utilization Branch, Procurement Division, U. S. Treasury Department; G. W. Van Keppel, President, Associated Equipment Distributors, and President, G. W. Van Keppel Co., Kansas City, Mo.; Lt. Col. Enoch R. Needles, Chief, Redistribution and Salvage Branch, Supply Division, Military Supply, U. S. Corps of Engineers; A. R. Guider, Chief, Requisition Division, Foreign Economic Administration; Hal G. Sours, Ohio Director of Highways; E. R. Galvin, President, Manufacturers' Division, ARBA, and General Sales Manager, R. C. LeTourneau, Inc.; and A. E. O'Brien, Executive Secretary, Associated Pennsylvania Constructors. Each member of the panel presented a 10-minute statement on his connection with the possible disposition of surplus equipment of various kinds located both inside and outside the borders of this country. This was followed by a series of stimulating and direct questions from the floor which clarified much of the foggy information on this subject and set at rest many rumors which had been current at earlier meetings. At a later session, Congressman Jesse P. Wolcott stated in no uncertain terms that the Congress intends to pass legislation to regulate the disposition of all surplus war material and equipment, possibly under its own direction, so as to preserve the national economy and prevent either inflation or a drop in the standards of our national economy through the dumping of surpluses promiscuously. This session is reported in considerable detail on page 16.

At the President's dinner on the evening of the second day the Bartlett Award for an outstanding contribution to the highway field was presented to H. S. Mattimore, at present with the Bureau of Yards and Docks, U. S. Navy, and formerly Engineer of Materials and Tests of the Pennsylvania State Highway Department for many years. The closing event of the dinner was a talk

by Captain Don S. Knowlton of the Marine Corps who spoke very frankly of the conditions in the South Pacific area and, in particular, of the events leading up to the final taking of Guadalcanal. He stressed the fact that the men at the front think constantly of home and of the jobs they want when they

return.

The morning of the third day, February 3, was devoted to group meetings of the various divisions of the Association, Highway Contractors, County Highway Officials, Municipal and Manufacturers, closing with a luncheon addressed by Jesse P. Wolcott, member of the Com-

mittee on Banking and Currency and Committee on Roads, U. S. House of Representatives.

During the afternoon, the annual business meetings of the Divisions and of the Association itself were held, closing with the meeting of the Board of Directors in the evening.



A FEW CENTS AN HOUR OPERATES A BARCO PORTABLE GASOLINE HAMMER

FIELD POST DRIVING

ROCK BREAKING

TAMPING

EASY TO CARRY

Makes Tough Jobs Easier...Can Be Carried Anywhere

Amazing things...these Barco Portable Gas Hammers that cost so little to operate and handle so many big jobs...that carry like lightweights and punch like heavyweights! With eleven special tool attachments, every job is made to order for them...whether it's breaking, driving or tamping. Consult us about your problems...our engineers are at your service. Barco Manufacturing Company, Not Inc., 1818 Winnemac Avenue, Chicago 40, Illinois.

BARCO

PORTABLE GASOLINE HAMMERS

Light in Weight & Rugged in Construction

BARCO MANUFACTURING CO., NOT INC.
1818 Winnemac Ave., Chicago 40, Ill.

Gentlemen:

Without obligation on my part please send me a copy of the BARCO HAMMER BOOKLET.

Name _____

Street _____

City _____

State _____



EXPERIENCE
builds 'em

PERFORMANCE
sells 'em

SAFE from Invasion is no idle boast today. The enemy has been driven from the Alaskan outposts and they dare not attack us here!

on ROGERS TRAILERS

The ROGERS TRAILERS which will be available to industry when present war contracts are completed, will be even better-engineered and more efficient than the thousands which have been operated so successfully for many years.

ROGERS BROS. CORPORATION
ALBION,
PENNA.



TODAY'S BEST BET—
WAR BONDS!

FEATHER the nests of our multiplying warbirds—or there will be no nests left to any of us. Buy Bonds. CONSERVE, stimulate, protect—all in one—buying Bonds.

Maintenance Methods Used in North Dakota

Work Formerly Done by Contract Now Handled by State Forces; Black Top, Gravel and Frost Boils

UNABLE to contract maintenance work, as done in normal times, the North Dakota State Highway Department has been obliged to rely on its own forces and equipment to carry on the maintenance program. While snow removal and the repair of frost damage account for a large portion of the maintenance budget, the preservation of over 1,800 miles of bituminous surfaces and 4,600 miles of gravel and earth roads is an important item.

In North Dakota, the Highway Commissioner, appointed by the governor for a term of six years, but removable for cause, is the executive head of the Department. J. S. Lamb occupies this important post at the present time, while Mark P. Wynkoop is Chief Engineer and Ray Robinson is Maintenance Engineer.

Finances

Seventy-five per cent of North Dakota's maintenance budget, which normally totals approximately \$2,000,000, is allotted to the seven districts on a mileage basis for routine upkeep of roads, with the remainder retained under control of the central office for special jobs of repair or betterment which are especially authorized without regard to districts but based entirely on the needs of the whole state highway system. The system has a total mileage of 6,559, comprised of 32 miles of concrete pavement, 1,175 miles of oil-mix surfacing, 668 miles of oil treatment, 16 miles of Tarvia surfacing similar to the oil mix, 4,514 miles of gravel-surfaced roads, and 154 miles of earth roads.

Rentals to cover repairs, gas, oil, storage, and depreciation, everything except the operator's wages, are assessed against each major item of equipment on an hourly basis for an intelligent analysis of road maintenance costs.

Bituminous Maintenance

Because of wartime restrictions, short-

ages of equipment and man-power which become more acute each month, and decreasing revenues, no attempt has been made to carry on a normal program of replacement and betterment of bituminous-surfaced roads during the emergency.

In order to preserve the highway system as much as possible, a light sealing is done by state forces, using 0.15 gallon of MC-1 cut-back per square yard, covered with approximately 12 pounds of sand. Cut-backs from Montana and Wyoming are readily available at costs of 8 to 9 cents per gallon.

On roads which require a more substantial treatment, 18 to 20 pounds of crushed gravel below 1/2 inch in size has been applied to each square yard, over an application of 0.30 to 0.35 gallon of

MC-5. Before the war, North Dakota preferred to use SC oils for work of this type but her experience with MC oils has been so satisfactory, according to Mr. Robinson, that the use of this type of cut-back will probably be continued in the future. Mr. Robinson's experience indicates, however, that the MC cut-backs should be applied at as low a temperature as possible to obtain best results under the climatic conditions existing in North Dakota.

A small amount of Mud-Jacking at bridge ends and the seasonal repouring of joints is the only work that has been done on the limited mileage of concrete pavement.

Gravel Roads

Since the major part of North Dakota's highway system consists of gravel roads, their repair and maintenance by replacement of the gravel lost annually through erosion and attrition has been a serious problem.

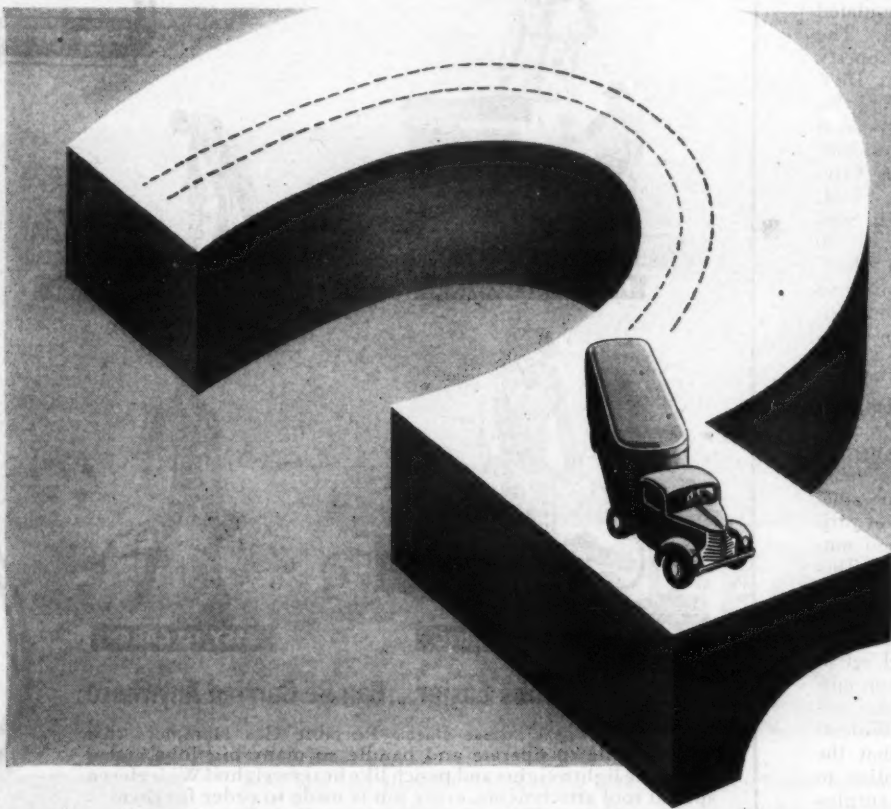
Gravel acceptable for this purpose is readily available in most sections of the



Oil-mix mat on U. S. 2 near Crary, N. D., ruptured by frost boils.

state, except in the Red River valley in the eastern section of North Dakota where it is sometimes necessary to haul it from 30 to 40 miles. In past years the maintenance department has let contracts for regaveling, including prod-

(Concluded on page 74)



GAS-SAVER QUIZ

for fleet operators

Can you answer "Yes!" to these questions and be sure you are right?

- Q. A clogged *Air Cleaner* can cut gasoline mileage as much as 40%. Are you sure the Air Cleaner is clean on every one of your trucks every trip?
- Q. Any *idling* wastes gas aplenty. Are you making sure your trucks aren't idling their heads off?
- Q. Sooty or worn *Spark Plugs* can waste up to a gallon of gasoline in every ten. Are you certain every plug on every truck is clean and efficient?
- Q. Are you certain that clean, properly adjusted *distributor points*, and correct timing are doing their share of gas saving for you?
- Q. Are you dead sure an *over-rich carburetor mixture* from high float levels and other causes isn't

eating quite a hole in the gas mileage of some of your trucks?

- Q. *Over-cooling* can cut down mileage per gallon. Are you sure thermostats are functioning, radiator covers are used when needed?
- Q. Stiff operation of transmissions and differentials means gas is being wasted. Are you sure the right grade of lubricant is in every truck?

This is a partial list of gas-saver questions to which a Standard Oil Engineer can help you find the answer—to give you the last inch of mileage out of your gasoline supply. Call the nearest Standard Oil Company (Indiana) office, or write 910 S. Michigan Ave., Chicago 5, Illinois. In Nebraska, call any Standard Oil Company of Nebraska office.

Oil is Ammunition . . . Use it Wisely

STANDARD OIL COMPANY (INDIANA)

STANDARD
SERVICE

★ LUBRICATION ENGINEERING

OUTSTANDING



The BURCH DRAWN TYPE ROAD MAINTAINER, a seven blade machine with its many adjustments make it outstanding in performance.

Power hydraulic control assures ease of operation. Ideal for shoulder work, black top and for gravel, dirt or cinder roads.

Manufactured by

THE BURCH CORPORATION

Crestline, Ohio

Equipment since 1878

Let's do our part,
BUY MORE BONDS

Report on Meeting Of AGC in Chicago

(Continued from page 39)

controlled by the Federal government in wartime to one in which the leading part in the future development of the nation will be taken by private enterprise will be one of unprecedented magnitude. The future of this country depends on how this transition is made, or if it is made. Unless industry itself takes the leadership in adapting itself to future changes and in recommending to the government how the change can be made most advantageously to the industry and to the public welfare, government will take the leading part in the nation's development after the war. Because construction is the first major industry able to return to peacetime operations, general contractors have great opportunities for service to the industry and the nation.

During the defense and war construction periods when the capacity of the construction industry was strained to complete needed facilities in the times required, the majority of AGC members were too busy directing the operations of their own companies to spare much time for activities in behalf of the industry. Now that war projects are being completed rapidly, contractors have more time which can be spent, without detriment to the war effort or to their own businesses, in helping to solve the major problems facing the industry and the nation.

Sessions and Speakers

In addition to the meetings of the various committees and subcommittees, and their reports, general sessions of the group were addressed by a number of outstanding speakers. The chief speaker at the opening session was Major-General Eugene Reybold, Chief of Engineers, who outlined the importance of construction in the war effort, and the necessity of making everything on the home front secondary to the task at hand—winning the war. John B. Blandford, Jr., Administrator, National Housing Agency, spoke on "The Outlook for Wartime and Peacetime Housing".

At the afternoon session, Thomas H. MacDonald, Commissioner, Public Roads Administration, discussed "Preparing for the Post-War Highway Program"; and William E. Hayes, Attorney of Washington, D. C., spoke on Federal taxes. On the second day, the speakers included W. A. Klinger, President of the W. A. Klinger Co., Sioux City, Iowa, and Past President of the AGC, whose talk was entitled "Venture vs Security"; Ernest M. Fisher, American Bankers Association, on "Financing Post-War Construction"; and S. Morris Livingston, of the Bureau of Foreign and Domestic Commerce, who discussed "Post-War Perspectives."

Committee reports covered a wide variety of industry problems, including used construction machinery, wartime regulations, labor relations, man-power, wage and hour developments, outlook for civilian construction, and safety.

New Officers for 1944

William Muirhead, President of the William Muirhead Construction Co., Durham, N.C., was elected President, succeeding Oscar B. Coblenz, President, McLean Construction Co., Baltimore, Md. H. A. Dick, President, Gilpin Construction Co., Portland, Ore., was elected Vice President to succeed Mr. Muirhead, and E. M. Rust, Vice President, Rust Engineering Co., Washington, D. C., was reelected Secretary-Treasurer.

The following men were elected directors for terms of three years: District 1, Dan J. Cavanagh, Twin Falls, Idaho; District 2, Ford J. Twaits, President, Ford J. Twaits Co., Los Angeles, Calif.;

District 3, C. B. Berry, President, Hamilton & Gleason Co., Denver, Colo.; District 4, J. Rutledge Hill, Vice President, Gifford-Hill Co., Dallas, Tex.; District 5, Geo. H. Murch, Vice President, Murch-Jarvis Co., Inc., St. Louis, Mo.; District 6, A. A. McCree, President, McCree & Co., St. Paul, Minn.; District 7, Robert E. O'Connor, President, J. C. O'Connor & Sons, Inc., Ft. Wayne, Ind.; District 8, Thos. B. Carmichael, President, The C.W. & P. Const. Co., Akron, Ohio; District 9, George M. Eady, President, George M. Eady Co., Louisville, Ky.; District 10, Ivy H. Smith, President, Ivy H. Smith Co., Jacksonville, Fla.; District 11, Henry E. Baton, President, Henry E. Baton, Inc., Philadelphia, Pa.; and District 12, Roy B. Rendle, President, Roy B. Rendle & Co., Inc., East Boston, Mass. S. L. Fuller of the John F. Casey Co., Pittsburgh, Pa., was elected to fill the unexpired term of C. E. Lott.

The new officers of the various divisions of the AGC are: Building Contractors' Division, Chairman, Ford J. Twaits, Ford J. Twaits Co., Los Angeles;

Calif., Vice Chairman, W. K. Shaw, Turner Const. Co., New York City; Highway Contractors' Division, Chairman, D. W. Winkelman, D. W. Winkelman Co., Syracuse, N. Y., Vice Chairman, Morris E. DeWitt, Porter-DeWitt

Const. Co., Poplar Bluff, Mo.; Heavy Construction and Railroad Contractors' Division, Chairman, G. W. Maxon, Maxon Const. Co., Dayton, Ohio, Vice Chairman, Lyman D. Wilbur, Morrison-Knudsen Co., Los Angeles, Calif.

Write
For
Details



A TOUGH ROLLER FOR TOUGH JOBS

Pierce-Bear 2-5 Tons
Variable Weights

Engineered for economical operation where the going is tough. Compact, easy to operate. Narrow rear roller gives heavy-duty compression. Built-in water tanks for wet rolling. Powered with Allis-Chalmers Industrial Heavy-duty Model "B" gasoline engine.

Manufactured by

H. W. LEWIS EQUIPMENT COMPANY

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SAN ANTONIO 3, TEXAS
Phone: Garfield 8137

**WARTIME PROBLEMS
of New Sand and
Gravel Plant
SOLVED BY...**

TELSMITH



- 1 TelSmith Super Scrubber
- 2 Two TelSmith Sand Classifiers
- 3 TelSmith Sand Drag
- 4 TelSmith Gyrasphere Secondary Crusher

G-11



● Hempt Brothers, Harrisburg, Pa., are quarry and gravel plant operators. War work demands for concrete necessitated building a new plant on a large deposit near Elizabethtown, Pa. Quantity processing of the crumbly quartzose conglomerate requires generous crushing, screening, classifying capacity. Yet co-operation with the war effort meant holding the use of new machinery and critical materials to a minimum.

One of those tough, it-can't-be-done problems. But TelSmith Engineers came through with the right answer and the right equipment. The result is a balanced, flexible, smooth-working plant turning out 75-100 tons per hr. washed silica sand.

From a scalping screen following the primary breaker, plus $\frac{3}{4}$ " material goes to a No. 36 TelSmith Gyrasphere Secondary Crusher in closed circuit with the scalper. Minus $\frac{3}{4}$ " goes to a 4' x 10' TelSmith double deck Pulsator Screen over a 35-ton steel bin. One size of crushed gravel is stored in bin; and plus $\frac{3}{16}$ " pebbles are chuted to a 40" x 22" TelSmith high speed, roller bearing Double Roll Crusher with adjustable flow belt feeder. This crusher is also in closed circuit. Minus $\frac{3}{16}$ " sand size goes through a 72" x 10 1/2' TelSmith Super Scrubber and then to two large-bowl, 3-side overflow, twin-screw TelSmith Sand Classifiers making concrete sand which goes to a 200-ton steel bin or to ground storage. Classifier overflow is flumed to a 60" x 30' TelSmith Sand Drag which produces plaster sand. For details on TelSmith equipment get Bulletin G-34.

SMITH ENGINEERING WORKS, 4014 N. HOLTON ST., MILWAUKEE 12, WISCONSIN

Cable Addresses: Sengworks, Milwaukee—Concrete, London
Room 1404—50 East 42nd St. New York 17, N.Y. 211 W. Wacker Drive Chicago 6, Ill. 713 Commercial Trust Bldg. Philadelphia 2, Pa. 19-21 Charles St. Cambridge 41, Mass. G. F. Sealey & Co. Toronto, Ont. Mines Eng. & Eqp. Co. San Francisco 4—Los Angeles 14 Wilson-Wessner-Wilkinson Co. Knoxville 5 and Nashville 6, Tenn. Brandeis M. & S. Co. Louisville 8, Ky. Charleston Tractor & Eqp. Corp. Charleston 22, W. Va. Roanoke Trac. & Eqp. Co. Roanoke 7, Va. North Carolina Eqp. Co. Raleigh & Charlotte, N. C.

Safety Goggles Must Be Properly Adjusted

Workers frequently refuse to wear safety goggles simply because the goggles are not properly adjusted and consequently are uncomfortable to wear. To prevent eye accidents caused by neglect of this safety measure, the American Optical Co., Southbridge, Mass., has prepared an illustrated booklet, "Right On The Nose", which gives in detail the quickest, easiest methods of adjusting non-prescription industrial safety goggles. Hints on the care of goggles, to protect them from undue wear and injury, are included.

Copies of the booklet will be supplied to safety directors, medical directors and other interested persons upon written application to the company.

The American Optical Co. has also made available, on a free loan basis, a sound motion picture on 16-mm film, dealing with this same timely subject.

Carbide-Tool Users' Vest Pocket Guide

The Carboloy Co., Inc., Box 237, Roosevelt Park Annex, Detroit 32, Mich., has issued a vest-pocket size booklet on carbide tools for steel cutting, which discusses the characteristics of different

grades of carbides designed for this purpose, the selection of proper rake and relief angles, and the design and grinding of chip breakers. A chart is included, giving recommended carbide grades for various cuts and speeds, and a section at the back of the book deals with important "Do's and Don'ts" for carbide tools.

Although carbide tools are now made mainly for war production, they will no doubt serve many uses in state and county highway department repair shops in the post-war period. Copies of the booklet, Manual GT-166, may be obtained from the Carboloy Co. Inc., by mentioning this item.

Integral Waterproofing For Concrete Structures

Integral application of a waterproofing compound as concrete is being mixed enables the structure itself to resist the penetration of water and is preferable to subsequent remedial treatment. Sika Chemical Corp., 35 Gregory Ave., Passaic, N. J., has issued a bulletin on its waterproofing compounds for integral waterproofing, which include the liquid Concrete Sika, Sika No. 1, a paste and Road Sika for rapid-hardening concrete. Copies of this bulletin may be secured by writing direct to Sika and mentioning this item.

IT'S A FINE PIECE OF THE PIE

- if your machinery is right!



be
Sure it's

Built by
IOWA

No matter who you talk to — no matter what combination you use, the figures for the future of construction add up to big ones.

All construction begins with aggregate, and considering that a part of the percentage of the "plant and equipment" figure should be included with "aggregate quarrying," over 8% of the highway dollar goes into aggregate production.

Aggregate is basic! Not another machine on the job can turn a wheel until the aggregate is available! Aggregate machinery must be dependable, and must deliver at low cost.

It is machine dependability and high production at low cost that has made Iowa the Headquarters for aggregate producing equipment. Check the names of Iowa owners! Check the output records! Check the number of machines Iowa ships as compared with others! These are the things that prove that big names, big jobs and "Iowa" go together. These are the things that guarantee that Iowa equipment will give you more than you ask on your future contracts.

It is a nice piece of pie, and there will be profit in it if you are Iowa-equipped. We'll be glad to help you with your plans.

THE IOWA LINE

of Material Handling Equipment
Includes

- ROCK AND GRAVEL CRUSHERS
- BELT CONVEYORS — STEEL BINS
- BUCKET ELEVATORS
- VIBRATOR AND REVOLVING SCREENS
- STRAIGHT LINE ROCK AND GRAVEL PLANTS
- FEEDERS — TRAPS
- PORTABLE PLACER MACHINES
- PORTABLE POWER CONVEYORS
- PORTABLE STONE PLANTS
- PORTABLE GRAVEL PLANTS
- REDUCTION CRUSHERS
- BATCH TYPE ASPHALT PLANTS
- TRAVELING (ROAD MIX) PLANTS
- DRAG SCRAPER PLANTS
- WASHING PLANTS
- TRACTOR-CRUSHER PLANTS
- STEEL TRUCKS AND TRAILERS
- KUBIT IMPACT BREAKERS

IOWA MANUFACTURING CO., CEDAR RAPIDS, IOWA

Steel-Concrete Bridge On U.S. 11 in Alabama

(Continued from page 46)

and approaches, are given below:

The first contract, covering the river bridge substructure, Project SN FAP-150-C(1), was awarded to Forcum-James Co., Dyersburg, Tenn., for \$149,451.97 and included the following items:

Bridge excavation	5,993.24 cu. yds.
Sub concrete	1,040.52 cu. yds.
Footing concrete	623.50 cu. yds.
Pier concrete	1,884.92 cu. yds.
Bar reinforcing	307,371 lbs.
Structural steel	3,134.96 lbs.
Test piles	4
Steel piling (furnished and driven)	7,985.6 lin. ft.
Removal of structures	Lump sum

The second contract, Project SN FAP-150-A(3), consisting of two relief bridges, was let jointly with the first contract to Forcum-James for \$32,345.81. The items involved included:

Steel test piles	4
Steel piling (furnished and driven)	6,486.18 lin. ft.
Steel piling (cut-offs)	44.82 lin. ft.
Bridge concrete	660.23 cu. yds.
Bar reinforcing	138,295 lbs.

The third contract, Project SN FAP-150-C(2), consisted of the steel superstructure and was awarded to the Virginia Bridge Co., Roanoke, Va., for \$172,800. The fourth contract, Project SN FAP-150-A(4), involved the removal of structures along the roadway approaches and was awarded to B. B. Etheridge of Gantt, Ala., for \$2,647. The fifth contract, Project SN FAP-150-A(5), for approximately 4 miles of roadway approaches, was awarded to R. T. Smith of Atlanta, Ga., for \$188,673.09 and included clearing and grubbing, small drainage culverts, grading, roadbed topping, loamy topsoil, and grassing items.

The sixth contract, Project SN FAP-150-C(2), for the concrete floor slab, handrail and lighting system, was awarded to the Milam Construction Co., Birmingham, Ala., for \$58,043.15, and included the following items:

Bridge concrete, Class "A"	1,145 cu. yds.
Bar reinforcing	262,000 lbs.
Lighting system, complete	Lump sum
Painting structural steel superstructure	Lump sum

The seventh contract, not yet awarded, will consist of approximately 4 miles of concrete paving 22 feet wide and is estimated to cost \$157,181.

The total estimated cost of the entire project is \$761,142.

Schedule and Personnel

The first contract for the Foster's Ferry Bridge on U. S. 11 was awarded on July 29, 1940, for the pier excavation which was started on August 14, 1940, and completed June 15, 1941. The erection of forms and the pouring of the concrete piers began August 19, 1940, and was completed August 31, 1941. Steel erection started July 12, 1943, and was completed October 30, 1943. The concrete deck was started October 22, 1943 and is being completed this month. The 3.4-mile approach fill at the north end of the bridge was started August



The north approach spans of the Foster's Ferry Bridge, with 2-column bents in the foreground, and the piers with web walls for the longer spans.

31, 1943, and was completed this month. Grading of the approach to the south end of the bridge has not yet started.

This high-level crossing of the Warrior River was built under the supervision of S. J. Cumming, Division Engineer, Third Division, Alabama Highway Department, with Rex Sikes as Project Engineer on the substructure until he

joined the Engineer Corps, U. S. Army. Captain Sikes was succeeded by J. J. Helton, who is now employed by TVA and was succeeded by S. H. Park who served as Project Engineer on the concrete deck. W. G. Little was Project Engineer for the Alabama Highway Department in charge of the roadway section on grading.

A Pick-Up for Shabby Masonry Structures

State and county officials who are responsible for the upkeep of highway department buildings, and in fact all persons concerned with building maintenance, will be interested in the announcement of a new product, Waterfoil, by the A. C. Horn Co. This coating, when applied to concrete, brick or stucco surfaces, is practically welded to the structure through the reaction of its component parts with the lime hydrate in the masonry, according to the manufacturer. The result is a firm hard covering which, nevertheless, is of a microscopically fine spongelike character which permits circulation of air. Besides strengthening masonry surfaces, Waterfoil is said to restore a fresh, new appearance to weatherbeaten, shabby buildings.

Further information may be secured from the A. C. Horn Co., 43-36 Tenth St., Long Island City 1, N. Y. Please mention this publication.

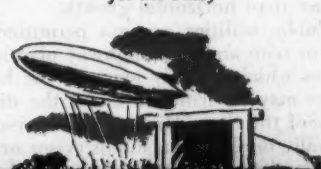
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Hayward Buckets

Roadsides and Parks On Indiana Highways

(Continued from page 42)

Tree Planting and Care

In the planting of trees along main highways in Indiana, care is taken to plant the trees in groups or to stagger them along the backslope to give a natural appearance. They are never planted on the foreslope or shoulder because of the hazard this creates if motor vehicles are out of control and leave the traveled way.

The only exception to the types of planting described above are at the entrance to towns, where a slightly more formal planting is used by placing the trees in rows with the proper spacing. In some cases it would seem that the trees were placed closer together than the normal spread of the branches would warrant. This is done to insure a continuous line of trees in the more formal plantings, and they are trained and pruned carefully to encourage vertical rather than horizontal growth.

Public utilities are not permitted to cut or trim any state highway plantings. Trees which already exist on the highways may be trimmed under the direction of the State Highway Commission. Usually the Landscape Supervisor or his assistant confers with the foremen of utility gangs and indicates just what trimming will be permitted. The utilities have shown excellent cooperation in following out these suggestions.

Personnel

The planting of trees along Indiana roadsides and the establishment and maintenance of turnouts and state parks and roadside springs are under the direction of the Maintenance Division, Norman F. Schafer, Superintendent of Maintenance, and Henry J. Schnitzius, Landscape Supervisor.

Work to Start on Last Madera Canal Section

Seventeen bids for constructing the final 17-mile section of the Madera Canal, part of the Central Valley Project in California, were received by the Bureau of Reclamation. Construction Engineer R. B. Williams, under whose supervision the work will be performed, stated that the number of bids received indicated the growing pool of idle construction machinery in the West.

The specifications divide the work into two schedules, the first extending the canal northward approximately 2½ miles from the Fresno River, and the second covering the remaining 14½-mile section of the canal to its terminus in Ash Slough east of Chowchilla. The contract for Schedule 1 was awarded to H. Earl Parker of Marysville, Calif., on the low bid of \$172,075, and the contract for Schedule 2 went to A. Teichert & Sons, Sacramento, Calif., on its low bid of \$456,306.50.

The work will require the excavation

of more than 900,000 cubic yards of dirt and 8,000 cubic yards of rock, the production and placing of 5,880 cubic yards of concrete, and 832,000 pounds of reinforcing bars and 62,100 pounds of gates, hoists and other metal work. Schedule 1 features the construction of a 2,300 acre-foot balancing reservoir as

part of the canal. Bureau engineers found that, by building four small dikes, a portion of two valleys could be converted into a reservoir which will facilitate canal operation. This Madera reservoir will be about 1½ miles long, with an average width of about 1,000 feet and a maximum depth of 25 feet at the outlet.

SKF Appointment

Announcement has been made by SKF Industries, Inc., Philadelphia, Penna., of the appointment of Walter C. Ahlers to the position of Detroit District Manager for the company, succeeding Robert H. Hirsch who has resigned.

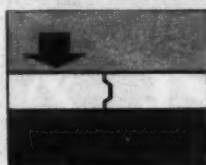
MAXIMUM LOAD TRANSMISSION IS ASSURED WITH KEYSTONE ASPHALT MASTIC BOARD CENTER STRIP

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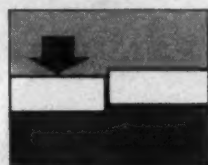
Tongue and groove joint allows for
normal expansion and contraction

Tongue and Groove Design Prevents "Blow-ups"

KEYED LOAD TRANSMISSION

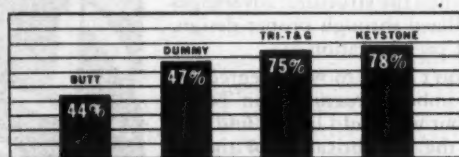


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A super-load for a modern highway. Special permits had to be secured for the load of 123 tons of cement contained in four steel tanks on a Fruehauf trailer. An Autocar diesel truck is pulling the load for the Calaveras Cement Co. of San Francisco.

New Vibrating Screen In Variety of Sizes

A new Cedarapids horizontal vibrating screen for either stationary or portable gravel plants has recently been put on the market by the Iowa Mfg. Co., Cedar Rapids, Iowa. Featured by the fact that it is full floating, with no transmission of vibrations to the subframe and with directional vibration forces which cannot become unbalanced, this new screen is available in single, double or triple-deck models, and in sizes ranging from 2 x 4 feet to 4 x 14 feet. The motor, driven by a V-belt and replaceable by a countershaft, if desired, is mounted on one side of the frame on a detachable platform.

The manufacturer states that, when installed on a portable plant, this screen gives complete access to either roll or jaw crusher simply by removing the crusher hopper. Its use on a portable plant reduces to a minimum the weight added by such an installation, which is an important item to portable-plant users. The screen operates flat, moving the material by the action of the screen, rather than by gravity. Its construction allows the piling on of material without injury to the screen cloth, which means faster yield per hour, or more capacity, it is reported. Other features include ease and simplicity of installing a new section of screen cloth or rearranging the combination of sizes, and the fact that this type of screen saves headroom.

Further information on this new Cedarapids horizontal vibrating screen, which can be installed in practically any plant, stationary or portable, may be secured direct from the manufacturer by referring to this item.

Work of Army Engineers Vital in Pacific Action

Reporting on a recent inspection tour of the South and Southwest Pacific theaters, Brigadier-General Raymond F. Fowler, Assistant Chief of Engineers in charge of military supply, said that our Engineers are building in two weeks airfields which the Japs could not build in three months. To carry on construction in the mountainous jungle-covered terrain in the South Pacific area, the Japs have a few light road rollers, a few light dump trucks and plenty of picks and shovels, while our Army Engineers move into the area with every type of

modern construction equipment.

Speaking of the Allied air bases in the New Guinea area, General Fowler stated that with minor exceptions these bases have been constructed in less than 12 months, literally hewn out of the jungle,

by American Army Engineers working with equipment so limited in amount that it was operated on three shifts, around the clock, seven days a week.

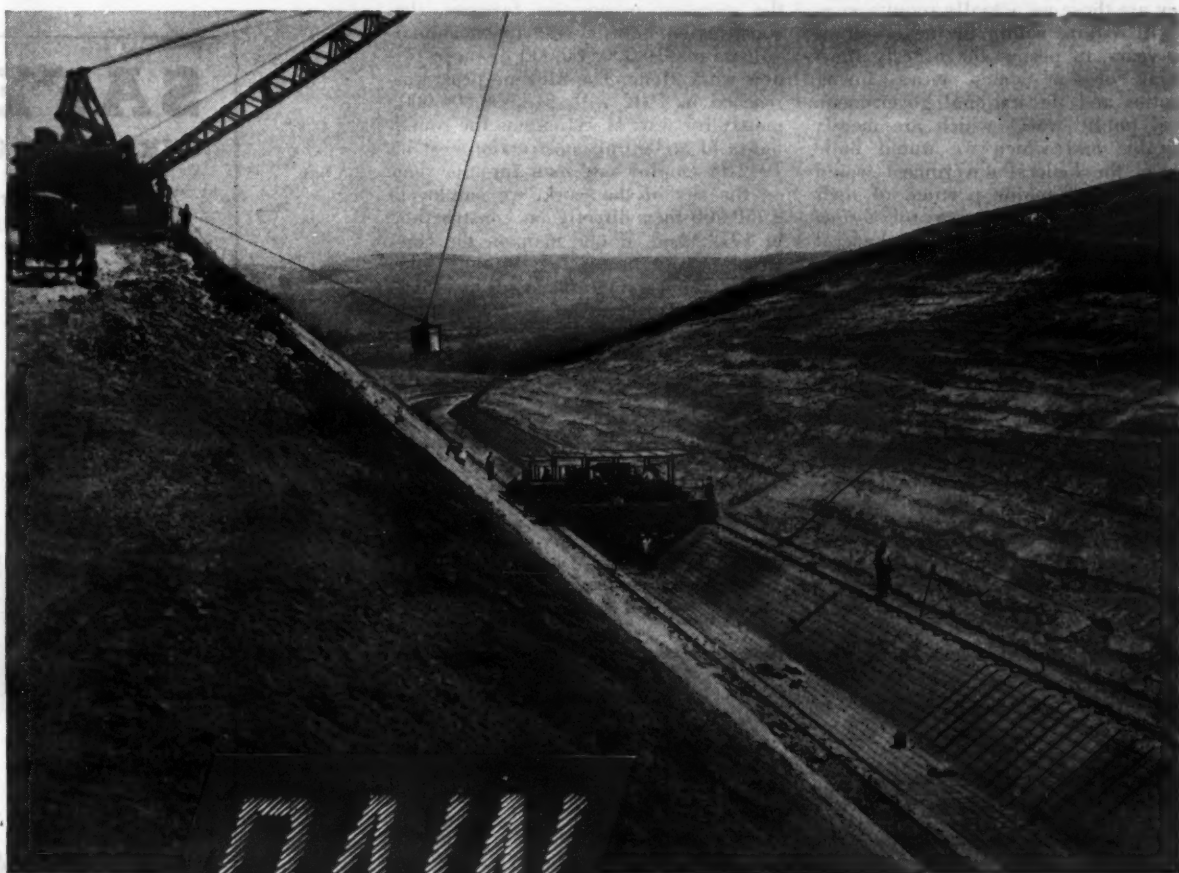
A description of one or two of these bases gives an idea of the magnitude of the task. The base at Port Moresby has a much greater runway capacity than that of the National Airport at Gravelly Point in Washington, D. C. In addition to the runways, there are many miles of taxiways and hard-standings. There are berths for several ocean-going ships, 25 miles of gasoline pipe line, and 400 miles of roads.

Another base, although more recent and less developed, is one of the most active in the entire system. It supports air bases still farther forward and an Australian ground force. These forward forces were flown into the jungle and are supplied by air. C-47's take off from this field at the rate of one every three minutes, and carry everything needed to fight a war, including food, gasoline, ammunition, artillery, landing mat, and even tractors.

New Airport-Highway Form for Double Duty

A new double-duty airport form, designed to meet the concrete form requirements for airport slabs from 12 to 24 inches thick, has been developed by engineers of the Heltzel Steel Form & Iron Co. The bases of these forms are 10 to 20 inches wide and the vertical height ranges from 11 to 24 inches in suitable combinations. Dual stake pockets and double treads permit the form to be used with either dimension for the vertical web. Sections are 10 and 15 feet long and provide means of pouring concrete airport slabs, access roads and landing strips with a single set of forms.

Bulletin B-19-A, giving details on these forms, as well as data on expansion control, load transfer elements, and dowsing systems for concrete runways of any thickness or width, will be furnished by the Heltzel Steel Form & Iron Co., Warren, Ohio, upon written application. Please mention CONTRACTORS AND ENGINEERS MONTHLY.



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Texaco Urso Oil X★★ is both detergent and dispersive. Its detergency keeps piston rings free and engine parts clean. Its dispersive ability holds deposit-forming materials in suspension until drained at

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TUNE IN FRED ALLEN EVERY SUNDAY NIGHT—CBS ★ HELP WIN THE WAR BY RETURNING EMPTY DRUMS PROMPTLY

Post-War Plans Lag, Reports Gen. Fleming

(Continued from page 35)

gress to say now whether or not any Federal participation in the cost of the construction of local public works will be forthcoming after the war, but there doubtless will be established, sooner or later, some form of Federal assistance and central control to provide aid and incentive for planning by local subdivisions of government. There is question as to the form this probable assistance will take. But it is felt it will be in the form of loans only, to be repaid in full when construction is launched, no matter how the construction might be financed.

When we talk now about planning for needed public works for possible construction during the post-war transition period, the term "needed public works" should be clearly understood. They are those we actually require now, or will require within the next four or five years, to permit the orderly functioning of our states, cities, towns, counties and the national government. Local public works which are merely desirable and which we would build only if the Federal government would pay all, or a major portion, of their cost are not in my category of needed public works. My list of non-Federal projects would include only those which local subdivisions of government should decide are needed now; or within the next few years, so urgently that they would themselves attempt seriously to finance their construction even if there

should be no Federal help.

A rigid application of that criterion would eliminate from present consideration the long-range changes and the "super-duper" 50-year plans some of our professional planners appear to favor. We haven't the time, the money or the men to devote to making plans now for long-range municipal face-lifting. We should confine ourselves to planning for the public works we cannot much longer do without. Such works alone are numerous enough to provide a reservoir of sound projects.

Public Work—the Stimulant

No thinking person believes for a moment that the development of a big construction program will solve all the problems of our post-war economy. It is much more complex than that. Many factors must enter into the solution, and public construction comprises but one of them.

Construction can be a most important stabilizer because it is the one major industry that can shift from war work to peacetime work almost over night. In the so-called prosperous twenties, the construction industry ran to an annual volume of \$10,000,000,000 or more for new work alone. The all-time peak was reached in 1942 with \$13,500,000,000, mostly for war. If we assume the round figure of \$6,000 of construction cost in 1942 to employ one man for one year on the site of the work, we employed 2,750,000 men directly on construction in 1942. And, if one man on the construction site meant two more in the forests, mines, factories and in transport, the industry that year carried a total employment load of 8,250,000 persons. Construction cost per man-year in the twenties can be roughly

estimated at \$5,000. On that assumption, a \$10,000,000,000 construction year carried a total employment load, direct and indirect, of 6,000,000 men. Admitting these figures are based on the roughest of assumptions, they are none-the-less formidable.

It should be remembered, however, they embrace both private and public building. In the \$10,000,000,000 years of the twenties, public construction, city, county, state and Federal, accounted for only about one-third of the annual total and for the employment of about 2,000,000 people. Obviously there are economic limits beyond which public works construction cannot be carried even in periods of the greatest prosperity. But for a short-run period of potential crisis, it could be readied to carry a tremendous load and so help materially to bridge the gap between war and peacetime employment.

It is well to bear in mind also that the more our reservoir of projects is supplied with plans for needed public works, the less is the likelihood that

we will be required to drain it to help provide immediate post-war jobs. Public knowledge of the existence of a reservoir so filled would provide a powerful stimulus to private industry. Industrialists then would know that, come what might, there would be work for men to do and there would be money in their pockets to buy what industry could produce. It follows (with a shift in the metaphor) that it is paradoxical but true that the more substantial the backlog of public works, the less likely that we will be required to burn it quickly.

An abstract of a paper presented before the 41st Annual Meeting and Post-War Highway Conference of the American Road Builders' Association, Chicago, Ill., February 1, 1944.

LaPlant-Choate Official

H. H. Buchanan, former Assistant General Sales Manager for Thew Shovel Co., has been named General Sales Manager of LaPlant-Choate Mfg. Co., Cedar Rapids, Iowa, manufacturer of earth-moving units for use with Caterpillar tractors.

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Snow-Removal Units Respond to Good Care

(Continued from page 50)

not actually engaged in earning a living on the property could be eliminated. Further, the St. Louis County Highway Engineer suggests that in certain isolated areas, especially in timbered areas where drifting is not a serious problem, roads might be opened only at definite periods, such as once a month. He also suggests the elimination of refinements in snow plowing.

"By this," he commented, "I mean to do a good job of plowing where such work is performed, but not to run the plows out for minor storms that do not interfere with traffic or create a hazard. This applies especially to storms in the autumn and spring when it may reasonably be assumed that warmer weather will follow."

Equipment Maintenance

Greatest emphasis, however, is placed on the use and protection of the snow-removal equipment. With the purchase of new snow-removal equipment restricted if not entirely out of the picture for the duration, Mr. Deibler suggests that a more careful allocation or assignment of the proper type of equipment for the class of plowing required will permit the old equipment to remain in better condition. He stresses careful shop check-up on units at regular intervals and urges that necessary repairs or servicing be made immediately.

Most plows and wings used on motor patrols and trucks for snow removal in St. Louis County are either partially or entirely cable-controlled. Even with the hydraulic equipment, it is necessary to use some length of cable on the wings. Mr. Deibler points to the importance of using a cable which will stand up under the trying and difficult conditions of winter work and suggests that careful consideration be given to the selection of this item.

A cable break on a wing plow in the middle of a deep drift may render a truck unit useless for hours while a replacement comes from the nearest shop, and in the meantime a vital war shipment may be delayed. The use of the proper type of cable, a cable which will withstand the rigorous treatment of winter maintenance work, is important in the conservation of equipment as well. A preformed-type wire rope is used on cable-controlled snow-removal equipment in St. Louis County because it has been found to give more dependable service under severe working conditions than an ordinary-type wire rope.

Boring Bits Standardized

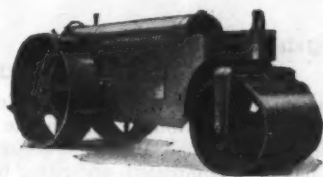
The kinds and sizes of wood-boring bits manufactured will be reduced from 1,285 to 422, a reduction of 67 per cent, by order of the War Production Board, it has been announced. This reduction has been made necessary by the fact that present manufacture, under the

handicap of numerous sizes and types, cannot take care of essential civilian needs after the heavy military requirements have been filled. Schedule VIII, containing the provisions of standardization, became effective January 22, but non-conforming bits may be shipped and delivered up to April 22, 1944.

New Cement Co. Officials

Announcement has been made by the Universal Atlas Cement Co., subsidiary of U. S. Steel Corp., of the appointment of Fred T. Wiggins as Assistant to the Vice President, General Sales, New York City, and of Robert H. Bond as Sales

Manager in Birmingham, Ala. Both appointments became effective February 1. Mr. Wiggins has been connected with the company, in various capacities, since 1926. Mr. Bond will have charge of sales in the six southeastern states of Alabama, Georgia, Florida, Mississippi, South Carolina, and Tennessee.

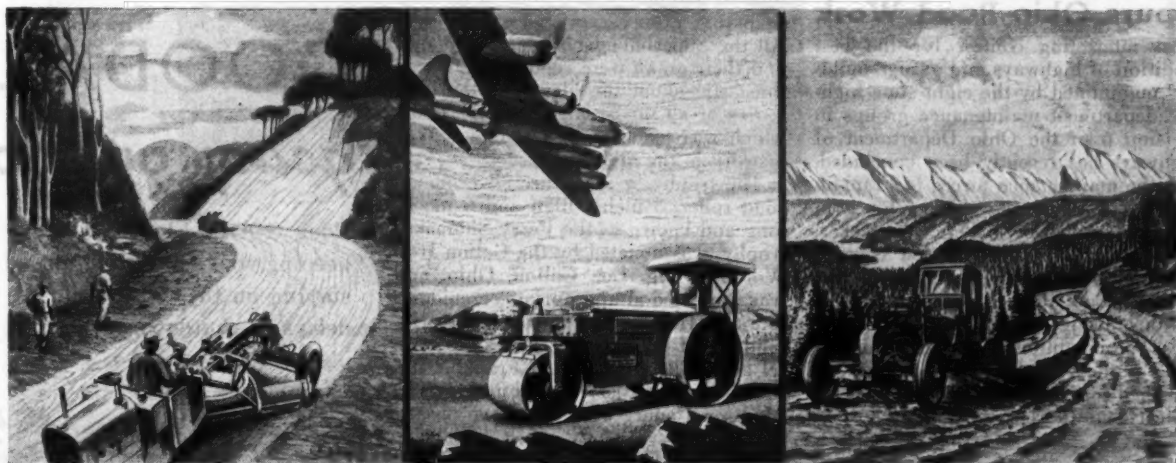


3-wheel
Roller

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FOR PROGRESSIVE ROAD CONSTRUCTION

In the March to Victory—In Post-War Planning



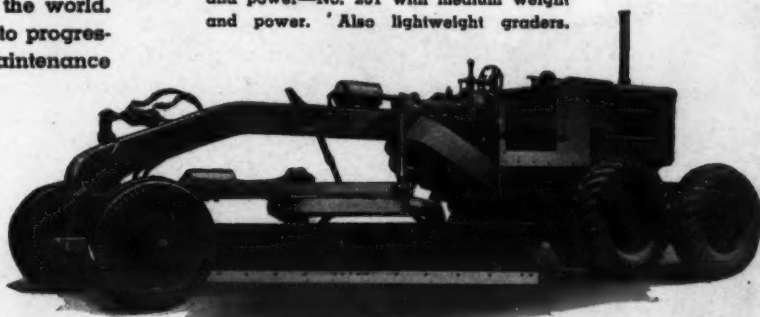
Galion continues to serve with essential road rollers and motor graders in all branches of the service.



Galion road machinery contributes to the all-out effort by serving with our armed forces in all parts of the world. Galion expects to contribute to progressive road construction and maintenance

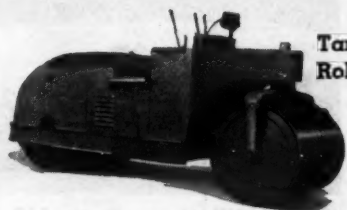
in the post-war period just ahead. Since 1907, Galion machines have provided top performance on thousands of jobs where speed, power, maneuverability and efficient operation are paramount. Remember Galion in your post-war planning.

No. 101 motor grader with maximum weight and power—No. 201 with medium weight and power. Also lightweight graders.



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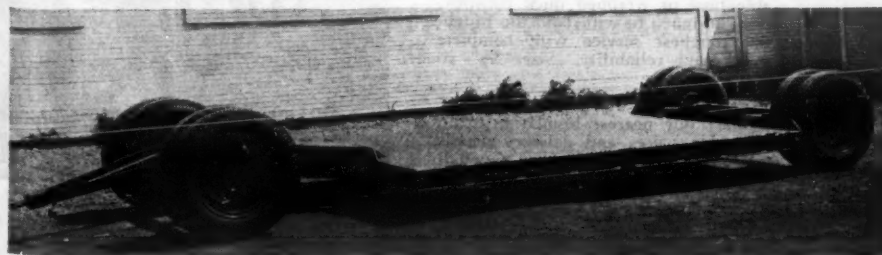


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- ★ Avoid waste. Salvage paper for military use.

CALL A COLLECTOR!





Highway department maintenance crews share a prize in a contest for road work. Left to right, J. Perry Shumaker, Division Engineer, Ohio Department of Highways, who inaugurated the contest; James M. Feustel, State Highway Superintendent of Maintenance in Franklin County, and Robert Phillips, Superintendent of Maintenance in Madison County, Ohio.

Highway Crews' Contest Spurs Ohio Road Work

An interesting contest for the best condition of highways and garage buildings maintained by the eight state highway department maintenance groups in Division 6 of the Ohio Department of Highways has recently been concluded, with the maintenance forces in Franklin and Madison Counties sharing top honors. Inaugurated by J. Perry Shumaker, Division Engineer, the contest covered the condition of the road surfaces, berms, shoulders and ditches, side road intersections, bridges, weed mowing, guard rails, and condition of the garage buildings for the year 1943. Points were established for each item, and the total for perfect conditions was made 1,000.

The winning groups each scored a total of 990 points, and none of the participating groups scored less than 900. All the Superintendents of Maintenance and their crews were reported to be enthusiastic about the idea, and the high scores of all the groups show the effort which was made to insure a high type of work in the division.

The trophy, a miniature silver-plated road roller, 3 inches high and 6 inches long and known as the Perry Shumaker trophy, was donated by the Galion Iron Works & Mfg. Co., Galion, Ohio, and was presented at appropriate ceremonies to State Highway Department Superintendents of Maintenance James M. Feustel and Robert Phillips in Franklin and Madison Counties, respectively. The Madison County crew will have possession

of the trophy for the first six months of the year, and it will then go to the Franklin County group for the balance of the year.

The contest judges were Frank C. Higley, Division Maintenance Engineer; Eugene W. Davis, Division Construction Engineer; and Sam Linzell, Engineer, Bureau of Maintenance, Ohio Department of Highways.

Virginia Road Builders New A.R.B.A. Affiliate

Organization of the Virginia Road Builders' Association as an affiliate of the American Road Builders' Association has been completed, according to a recent announcement by Charles M. Upham, A.R.B.A. Engineer-Director. In accordance with A.R.B.A. policies, the new Association will cooperate and assist in the establishment of an adequate national highway program and an adequate state highway program.

The Virginia group's membership represents a cross section of the road-

building industry and profession, including engineers, contractors, highway officials, material dealers, highway users, and Virginians interested in good roads.

Officers of the Virginia Association are: President, Kenneth L. Black, Richmond; Vice President, Nat Pendleton, Wytheville; and Secretary-Treasurer, Henry C. Hofheimer II of Norfolk.

A. J. "Gus" Rayner, who for some 26 years has been engaged in various phases of the road-building profession, both in the United States and foreign countries, has been appointed Executive Secretary of the new Association. Mr. Rayner started in the construction industry as a water boy on a subway tunnel job at the age of 16, and since 1925 he has operated from the middle west to the Atlantic coast for the Barber Asphalt Corp., A. J. Rayner, Inc., and the Lake Asphalt Corp., in the construction of Trinidad Lake asphalt pavements. Prior to accepting the Virginia position, Mr. Rayner handled public relations for the Wm. P. McDonald Corp., contractor, of Flushing, L. I.

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"76" GRADER BELTING. Rugged, long-wearing, thoroughly reliable. Made of 32-oz. duck, with 16 to 19 lb. friction. Tensile strength of cover, 1,700 to 2,200 lbs. 18" to 48" widths, 4-ply.

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Ice-Free Runways At Army Airports

Snow and Ice Problem at Northern Airfields Solved By Speedy Plowing and Salt Treatment

AIRPORT runways cleared of ice and snow so that the planes of the Army Air Forces can land safely at all hours are essential at bases in the northeastern heavy-snow belt. Thanks to the snow-removal technique and the use of rock salt, not a single plane was forced to use an auxiliary field last winter, Robert Evans, Civilian Superintendent of Grounds at the huge Rome, N. Y., Army Airfield, headquarters of the Rome Air Service Command, reports. Under Mr. Evans' direction, a civilian crew of forty-two men fought the 194-inch snowfall of last winter, keeping the troop area open with six plows mounted on jeeps, clearing service roads, parking areas and the bus route, as well as maintaining clear safe pavement on the three concrete runways.

Sleet, high winds, and sudden drops in temperature throughout this area complicate the work of the crew, and unless constant vigil is maintained, there may be ice formations on the runways which endanger a plane during landing as much as ice coating on wing surfaces and propellers do when pilots aloft pass through zones of freezing rain. Although meteorological forecasts receive careful attention by the Superintendent, beginning in mid-October, Mr. Evans, who has had years of experience in highway work in central New York, relies also on his weather eye and knowledge of local conditions.

Because the winter is particularly severe in this area, engineers at other fields are guided by the recommendations based on the experience accumulated by Mr. Evans as to the most effective methods of combatting storms. Straight salt was used very satisfactorily for preventing ice formation and facilitating snow removal from runways during the early part of last winter, Mr. Evans states.

During the winter of 1942-43, 200 tons of salt was used on the reservation. The route of the bus lines entering the field is treated with straight salt to prevent traffic congestion and delays because, for the majority of the civilian personnel at the field, this is the only means of transportation.

Because insufficient equipment was on hand for heavy storms, crews sometimes worked as long as 80 hours at a stretch to keep the runways safe at all hours of the day and night for arriving planes. Additional equipment was on hand to cope with the worst that the winter of 1943-44 might bring, and Mr. Evans estimated that 600 tons of salt would be used to do a complete job.

Procedure

After experimenting with varying con-

centrations of salt with sand, Mr. Evans found that a 25 per cent by volume addition of salt to the abrasive gave satisfactory results. At the first sign of accumulating snow, four heavy-duty V-plows with the blades adjusted to give a close cut are sent out to clear the runways. In their wake, trucks carrying 4 tons of salt

and sand thoroughly mixed distribute the anti-freeze blanket uniformly by means of a Humphrey spreader. The trucks move as fast as 30 miles an hour, and can quickly cover the entire length of the runways with a protective coat. The dissolving salt in the mixture melts the remaining thin blanket of snow left

on the runways after the initial trip of the plows, and keeps the snow in a mealy condition so that, as often as is necessary during the course of the storm, the plows can clean off the snow right down to the bare pavement, without encountering ice or leaving behind areas where a sheet of

(Concluded on page 75)

1,000 TONS per DAY with Universal Standard 6 Unit Plant



Over 100 tons per hour, 1,000 tons per day—day after day—of ballast, mostly 1½" and 1", are being turned out at minimum cost for the Burlington Railroad at Wyalusing, Wisc. This plant, one of a number owned by E. C. Schroeder of McGregor, Iowa, consists of 6 standard units selected as most suitable for this rail-side quarry. Timber was used wherever possible to conserve metal. Output is up to the expectations of all concerned.

This plant, made up of 6 "packaged" units and arranged to provide a minimum of handling, includes: a 20" x 36" roller bearing primary jaw crusher of Universal's exclusive

light-strong Streamlined design; a 40" x 24" roller bearing star gear roll crusher for secondary reduction; 4' x 8' three deck gyrating screen; a 36" x 8' apron feeder with bar grizzly and by-pass (to by-pass fines around primary crusher); a 24" x 108' lattice frame conveyor from primary crusher to screen; and an 18" x 44' channel frame return conveyor. This is another case where soundly engineered standard units of the proper size selected from Universal's complete line were brought together to form an efficient, profitable plant. Probably we can do the same for you.

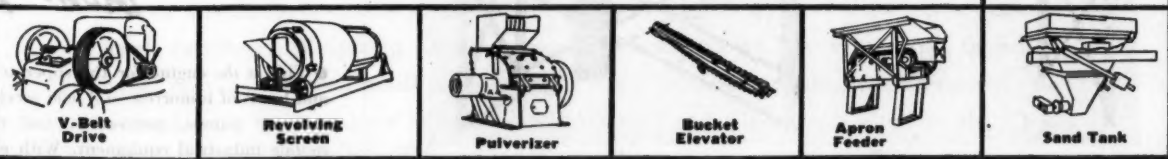
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You can still get
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only \$18.75!!!



Suggested Principles For Route Selection

(Continued from page 53)

However, reduction of the number of intersections presents problems in the design of arterial routes and the control of traffic flow which are more difficult of solution than similar problems encountered on rural highways. For instance, the ideal arterial street would have no intersections, yet it is obvious that all cross streets cannot be closed in order to attain this ideal.

One solution to the problem of intersections is the grade separation, which eliminates the hazards, delays, and costs entailed by encounter with cross traffic streams. Although they involve expensive construction, a judicious choice of location to minimize the number of intersections is one means of decreasing this expense.

Wherever it is possible to do so with satisfactory accommodation of the local arterial traffic, routes should enter a city at points from which it is possible to proceed as near as desirable to the city center and thence to connection with the continuing rural routes at the opposite side of the city, by locations parallel to one or the other direction of the normal rectangular street plan. Such locations will usually encounter a minimum number of street intersections in traversing the city and are generally to be preferred for this reason. They are also preferable to diagonal or curving locations because of the greater simplicity of the intersections.

Locations adjacent to the usually

winding or curving bank of a river or the curved or diagonal line of a railroad should be considered as exceptions to the rule stated above. Such locations usually offer the advantage of protected or infrequent access from one side, and this may offset the disadvantage of greater length within the city and consequent number of streets passed on the other side.

Location in proximity to a railroad is generally considered somewhat objectionable. It need not be, however, if by electrification, the use of diesel power, appropriate screening and landscaping, or other means, smoke, noise, and unsightliness are abated.

The valley of a small stream penetrating a city may offer excellent opportunity for the location of an intersection-free artery. In many cases such small valleys exist in a wholly undeveloped condition. In others they are the locations of a very low order of development—neighborhoods of cheap, run-down houses and shacks, abject poverty, squalor, and filth. Where these conditions exist, steep declines into the valley have made the site unfavorable for the development of high-class improvements.

Often a small valley of this kind interrupts completely, or more or less effectively, many of the transverse streets. Intercourse within the city has already adjusted itself to crossing at relatively few principal points where bridges have been provided. Under these conditions the valley may provide the most fortunate of opportunities for the location of city-entering arterial routes. Its conversion to that use may yield the benefits not only of quick and free traffic flow, but also of eradication of a longstanding eyesore and blight upon the city's attractiveness and health.

Even at the expense of some indirection in the location of the route, it may be greatly advantageous to convert undeveloped areas to such use.

After an interregional route has been carefully located so as to minimize the number of cross routes, a considerable number will still exist. The grade of all that cannot be avoided should then be separated. And finally, all sections of the Interregional System in cities, those serving as circumferential distributors as well as the city-penetrating routes, should be established as arterial highways of limited access.

Further Methods of Route Selection

The principles of route selection in cities vary according to the size and complexity of the city. Several schematic layouts of possible conditions of main penetrating and circumferential or distributor routes are given in the illustration on page 67 and will be discussed here.

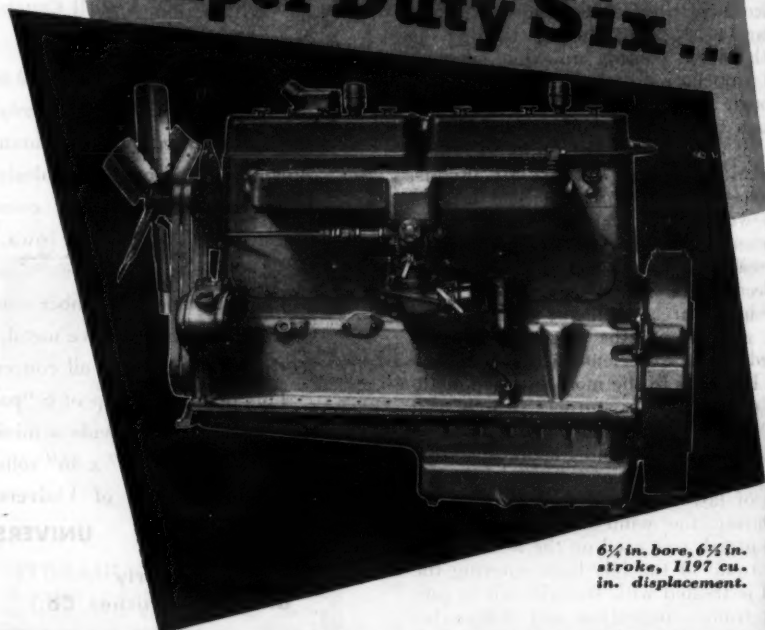
The simplest case is that of the small city. In this case the Interregional High-

way passes on a direct course wholly outside the city. The former main highway, which now serves as a city-service road, diverges from the interregional route at some distance on opposite sides of the city. Thus it provides a connection between the interregional and the other main highway that passes through the small city. The service road may or may not be considered as part of the Interregional System, depending upon the size of the city, its distance from the interregional route, and the relative volume of traffic the service road and the other main highway contribute to the Interregional System. In this case, however, no circumferential or distributing routes are needed.

In the case of a medium-size city, a single route of the Interregional System approaches the city from the north and south and necessarily passes through the city closely adjacent to the business section to pick up and deliver the substantial volume of traffic there originated or destined. For the accommodation of the

(Continued on next page)

Model WAK Super Duty Six...



6½ in. bore, 6½ in. stroke, 1197 cu. in. displacement.

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Crankcase and cylinder frame are cast as one unit... so braced as to give the

entire structure remarkable rigidity. Riding in its seven hefty, husky, four-inch bearings, the heat-treated steel crankshaft is positively aligned... stays that way.

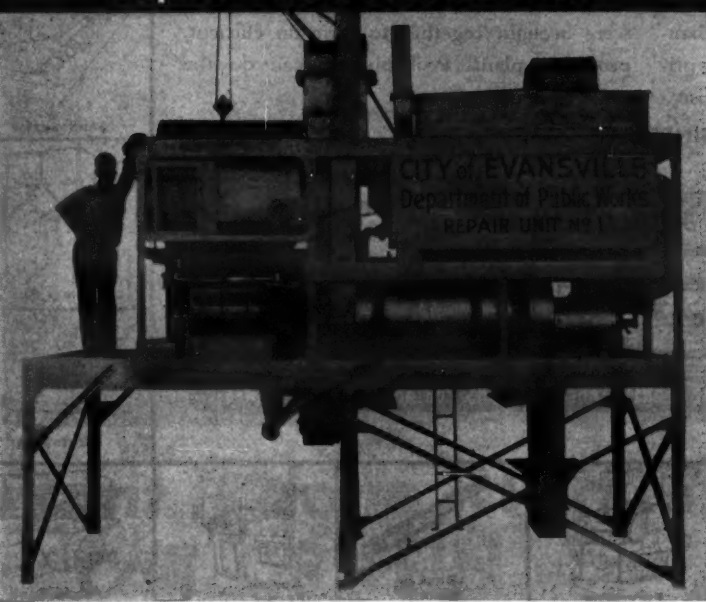
When servicing a Super Duty Six, you do it the easy way—that's another Waukesha construction advantage. Valve grinding is simplified. Since it's an overhead valve engine, you remove the heads and do it where it's most convenient. Each cylinder is a wet type sleeve. Press it from the main case and replace it—it's that easy.

Include this Waukesha Engine in making your postwar plans. Write for Bulletin 1138.



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Urban Traffic Problems Need Post-War Solution

(Continued from preceding page)

considerable volume of through traffic on the interregional route, a circumferential route, considered as part of the Interregional System, diverges to the right at a convenient point south of the city and passes along the eastern boundary to rejoin the main route at a point north of the city. The distance around the city by this route is little if any longer than the distance through the city by the main route. The circumferential route serves also to pick up and deliver traffic at several accesses provided in the city's eastern quarters.

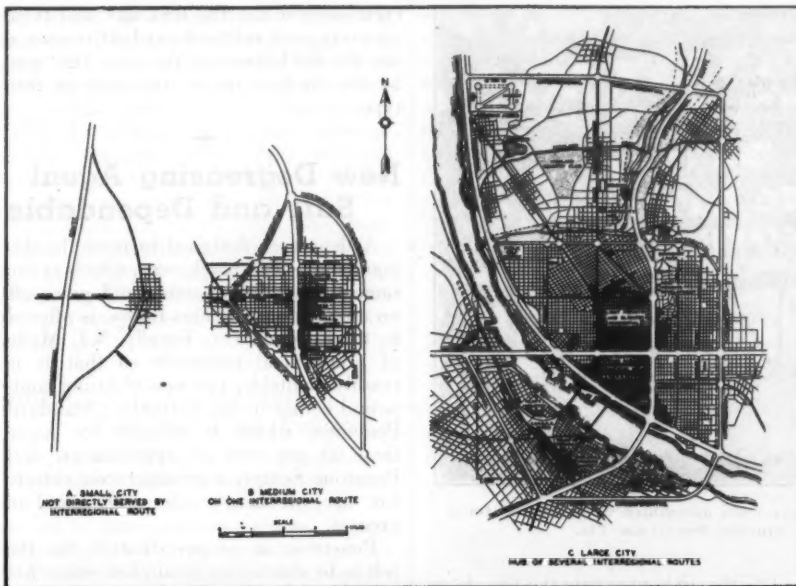
Another main highway, not included in the Interregional System, intersects the interregional route at the center of the city. For transfer of through traffic between this route and the interregional route, a circumferential route is provided around the west side of the city, but because of its relative unimportance in the service of interregional traffic, this route is not considered as part of the Interregional System.

The large city offers the most complex pattern of main and circumferential interregional routes and other local belt lines that may be required for the adequate service of both interregional and local traffic. In the case illustrated, three interregional routes intersect at the city and all must pass within convenient reach of the large central business section.

One follows along the bank of the river as it approaches the city and continues in this location through the city. Another approaches from the northeast and enters the city through a wedge of undeveloped land, then passes on a north-south course along the border of a new housing development, skirts the eastern fringe of the business section, crosses the river, and finally resumes its southwesterly course as it emerges from the city. The third crosses the city from east to west, skirting the northern edge of the business section. In addition, several other principal highways center in the city. In this case, the three interregional routes combine to perform the function of traffic distribution around the business section.

At convenient points to the north, east, south, and west of the city, interregional circumferential routes intersect the main penetrating routes and serve to transfer through traffic from one to another, and to distribute the interregional traffic to the several quarters of the city. The locations of these routes are such that in no case is the distance around the city materially different from the through distance.

To the north of the city there is considerable scattered suburban development, and the northern leg of the Interregional circumferential route crosses east and west above all this development. An additional east-west distributor closer to the city is located as an inner circumferential route approximately along the northern city limits. It connects with the eastern interregional circumferential and with the riverside interregional route.



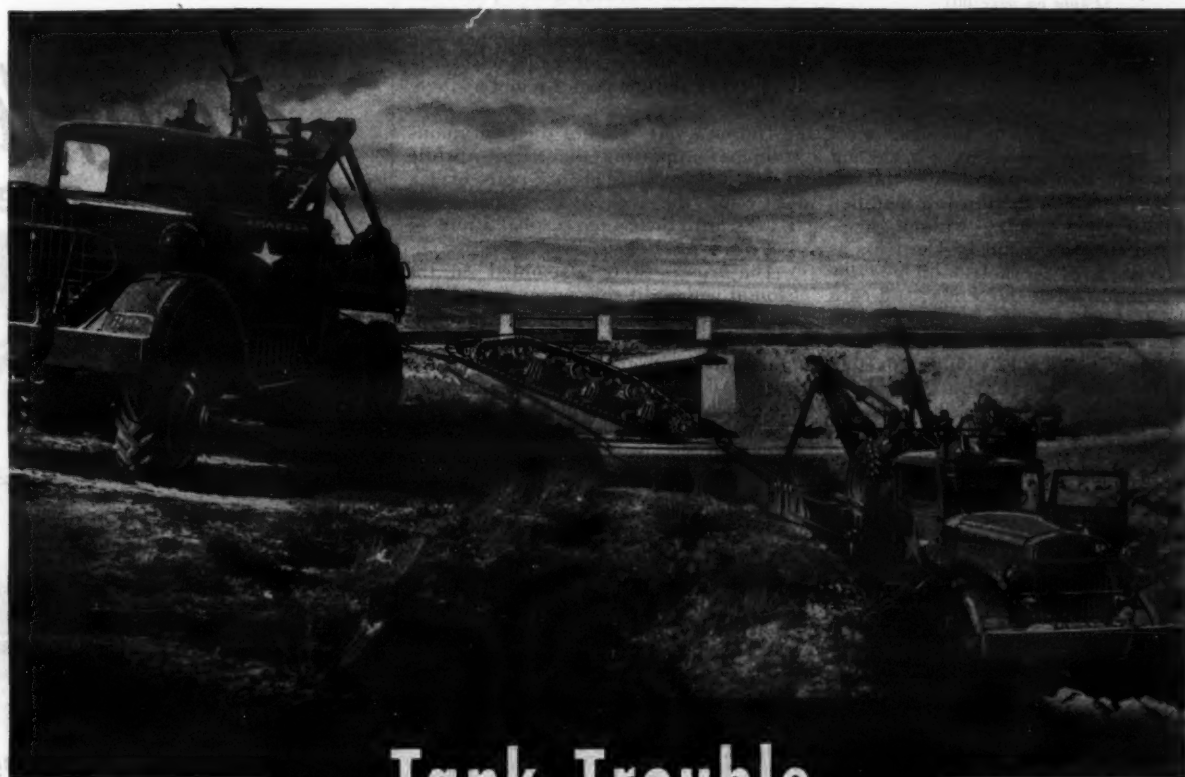
Schematic layouts showing various combinations of main Interregional routes required for the adequate service of traffic at cities of different sizes.

Since it performs mainly a local distributing service, it is not considered as part of the Interregional System.

Within the area circumscribed by the interregional circumferential routes, access is provided to the main interregional routes and the circumferential routes at several suburban communities and at certain streets which extend uninterruptedly across the city, and which for that reason are well adapted as internal collectors and distributors of traffic.

The diagrams given represent purely imaginary cases. An effort has been made, however, to include in them some of the situations that may be commonly encountered. Study of these diagrams by location engineers will suggest most of the essential relations of the main interregional routes and circumferential and distributing routes, and the difference between circumferential routes that should properly be considered as parts of the Interregional System and those that may not be so considered because of their primarily local function.

(Concluded on page 79)



Tank Trouble

WHEN an Army tank comes a cropper, as this one did, somewhere on the invasion front, it's a job for M-type heavy wreckers, specially designed for tank recovery. Weighing fifteen tons, with power delivered to all ten wheels, armed with hoist, power winches and special gear, these big fellows command the situation.

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finished, you may well want similar trucks for the tough jobs in your civilian business. Many will. Or you may be thinking in terms of over-the-road tractors, heavy duty trucks, dump trucks, plows, fire apparatus, or other motorized equipment engineered to the particular work it is to do. One thing is sure . . . if it's Ward LaFrance, it will be *right* for its job. Our engineers are ready to start working with you now.

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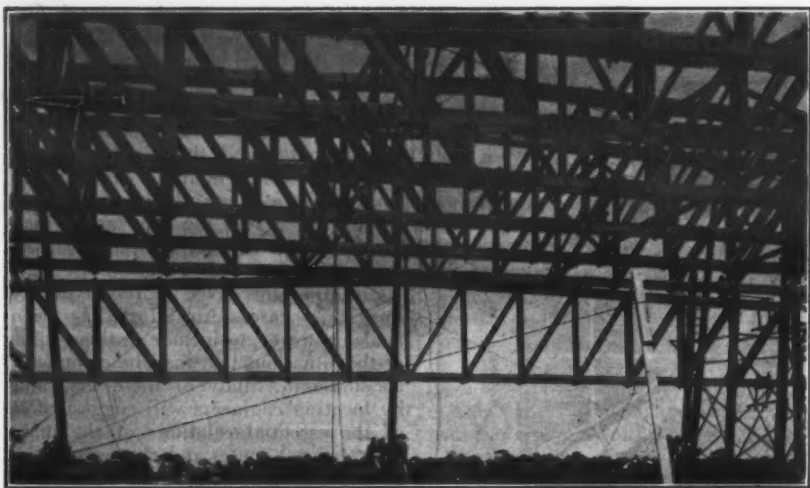
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Official U. S. Navy Photo
Three gin poles with hand hoists were used to erect the assembled wood trusses for a service building at the Naval Air Station, Pensacola, Fla.

Long Timber Trusses At Naval Air Station

(Photo on page 80)

In the construction of a service building at the Naval Air Station at Pensacola, Fla., requiring a 120-foot clear span, it was necessary to use a series of timber trusses instead of the usual steel trusses. Several designs were made and studied. The first was too heavy, the second too light, and the third, a modified design of great stiffness without excessive weight, was accepted. The truss as finally designed is 12 feet high at the ends and 14 feet at the center, and each of the 30 trusses for the structure is supported on timber columns at each end, made up of five 4 x 12's bolted together with split-ring connectors, at a height of 30 feet from the bottom chord to the ground.

The lower chord consists of pairs of

4 x 12's throughout, while the top chord has two 6 x 12's for the first two panels from either end and two 6 x 12's and one 4 x 12 for the remaining five panels to the center. The diagonals for the first three panels from the ends are pairs of 4 x 12's; for the next three panels, pairs of 4 x 8's; and the center panel a single 4 x 8.

The end verticals are the continuous columns supporting the trusses, while the next three verticals are pairs of 4 x 12's, and the second three pairs are 4 x 8's, with the center vertical a pair of 4 x 6's.

The trusses were assembled on the ground with split-ring connectors, lifted into vertical position, and raised to the proper elevation by three gin poles using hand hoists with from one to five men on the handles, as shown in the accompanying illustrations furnished by the Public Relations Officer, Naval Air Training Center, Pensacola, Fla. The contractor's

crew erected one the first day and then an average of two and one-half trusses a day for the balance of the job. This was by far the best record for work of this type.

New Degreasing Agent Safe and Dependable

A degreaser designed to meet the demands for clean machinery, which at the same time is inflammable and gives off no noxious or injurious fumes, is offered by the Penetone Co., Tenafly, N.J. Made of non-critical materials so that it is readily available, this new cleaning compound comes in two formulae: Standard Penetone, which is suitable for more than 80 per cent of applications, and Penetone Senior, a stronger concentrate for use on heavy oils and caked-on greases.

Penetone, in proper dilution for the job to be done, may be applied either hot or cold where the oil to be removed is of light-body variety. Heavier oils require

a solution warmed to about 180 degrees F and, while rinsing may sometimes be omitted, it is frequently advisable that the rinse be of the same temperature as the degreasing bath. Small metal parts may be placed in a bath consisting of a solution of one part Penetone to ten parts of water. Larger parts are cleaned by wiping with rags moistened with the diluted solution.

A third product, known as Penetone Major, is recommended for heavy-duty degreasing. This concentrate is combined in varying ratios with kerosene or water or both, depending upon the hardness and depth of grease to be removed.

These three products are also useful for cleaning floors under machinery, garage and grease-rack floors, and chassis and wheels of trucks and automobiles. Further details may be secured direct from the company, which offers the advice of its laboratory technicians in solving any degreasing problems. When writing, please mention this publication.

when SUPERHIGHWAYS are built again...

Ewing Galloway Photo



Will You Be Among the Low Bidders?

A TREMENDOUS backlog of critically needed road construction is building up for the postwar period. Are you getting ready now to meet it? Today is a good time to investigate the advantages of Buckeye R-B Power Finegraders for faster work, lower costs, better grades, reduction of loss of yield. These machines eliminate delays on the grade which hold up the paving crew, do away with fussing with high and low spots, assure you of a gradeline that meets specifications. No other existing equipment can prepare subgrade as quickly, accurately or cheaply. Send for a descriptive bulletin today and be ready to be among the successful low bidders tomorrow.



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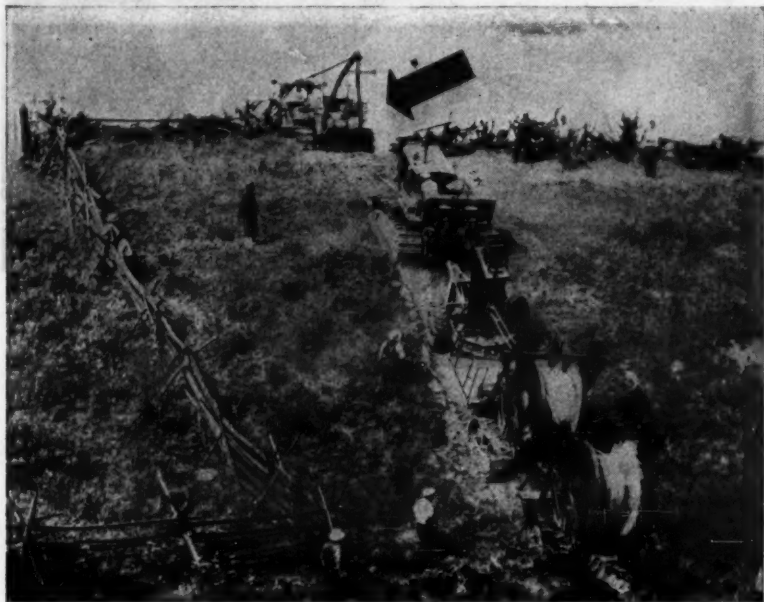
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LOOK AHEAD

Studies of business cycles show that in prosperous times, approximately 12% of our national income has been generated by the construction industry. When construction volume has fallen much below this, a downward spiral toward depression has resulted.

Control construction and you hold the key to economic balance. Every dollar invested in construction adds to the national wealth. Highway officials, contractors and business leaders should organize now to be ready with public works plans when the war is over.

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... This Time It's a Cable-Laying Job!

For laying underground cables cross country the lead tractor was equipped with a HYSTER Towing Winch and short gin pole. This unit serves two principal purposes: first, the carrying of the reels of cable to the cable trailers; second, assisting the complete train of equipment through heavy ground conditions and up steep grades too tough to manage from the drawbar. Just two of the 101 jobs HYSTER can do. Inquiries invited.



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STRADDLE TRUCKS, LIFT TRUCKS, KARRY CRANES

Present and Post-War Safety on Highways

(Continued from page 51)

them, than even the best of today or of yesterday.

We need general records, combining the experience of many states and cities, to sharpen our knowledge of what is really essential in design and to strengthen our arguments for those features which we already believe to be essential. We know, without statistics, that a divided highway without grade crossings is safer, but how much safer? It is no credit to any of us that such data are not already available. The cost of collecting them is an infinitesimal fraction of the money spent on construction.

We need better accident data, not only in general but in particular, data that will put the spotlight on the hazards of particular intersections, particular stretches of highway, particular times of the day, week or year, particular kinds of violations, particular drivers and types of drivers. A small fraction of a cent out of every highway dollar will provide this information and will repay its cost many times over in more efficient policing, driver training, licensing, and general public education, as well as in highway design, maintenance and equipment.

From an address before the Mississippi Valley Conference of State Highway Officials, Chicago, Ill., January 29, 1944.

Resolutions Passed By Minnesota A.G.C.

At the Twenty-Fifth Anniversary Founders Meeting of the Associated General Contractors of Minnesota, held in Minneapolis in January, two significant post-war resolutions were passed by the association.

One asked Congress for a policy declaration on post-war construction activity, with the request that the Federal government refrain from engaging in post-war public works which directly or indirectly compete with private enterprise, state or local government. Other points included limitation of financial participation by the Federal government, except on projects of inter-state or national character, to planning assistance, and revision of Federal tax laws so that industries preparing plans now may account for these costs as current expenses, and that future Federally-financed public works be performed by private enterprise through the contract system.

The second resolution commended the post-war planning efforts of the Minnesota Construction Planning Committee and asked the Legislature and the Governor to set up a body with sufficient funds to encourage post-war planning now.

WPB Figures Show Construction Decline

The War Production Board has announced that total construction in the United States in November, 1943, represented expenditures of \$401,298,000, 13 per cent less than the preceding month and 64 per cent less than the corresponding month in 1942. A further decrease of 11 per cent was anticipated for December. This decline is in accordance with expectations, and is due primarily to the fact that the bulk of military construction, such as camps, cantonments, recreation centers, airfields, et cetera, has already been completed. Another important contributing factor is the WPB restriction of civilian construction to essential needs.

The November volume of \$401,298,000 comprised four major classifications: Military, \$132,984,000; Industrial

expansion, government and privately financed, \$96,514,000; Housing, government and privately financed, \$101,800,000; and all other construction, including public roads, sewers, community buildings, utilities, and other non-residential projects, \$70,000,000. Military construction showed a drop of 25 per cent as compared with November of 1942, when the Army and Navy were expanding their facilities at a rapid pace to meet wartime requirements. On the other hand, government-financed housing projects showed an 8 per cent increase.

Red Comet Equipment For All Fire Fighting

Types of Red Comet fire extinguishers suitable for a wide variety of needs, from the hand grenade type, units to be attached to automobiles or trucks, in portable kits, to the large automatic type are all described and illustrated in a recently issued series of folders. The type of most interest to safety engineers, and

state and county highway officials in charge of garages, shops, and highway office buildings, is the automatic, which comes in two sizes, and for both ceiling or wall installation. When the heat of the fire reaches about 160 degrees, the fuse melts, automatically breaking the thin glass grenade, and a spray of fire-extinguishing fluid is released which is turned by the heat into a fog of great fire-smothering potentiality. This blan-

ket of fog keeps away the oxygen, without which the fire cannot live. Red Comet fluid is a highly refined carbon tetrachloride which, it is stated, will not injure furniture, machinery, equipment or records.

Copies of these folders may be secured by interested contractors and state and county highway engineers direct from Red Comet, Inc., Littleton, Colo., by mentioning this item.

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Guadalcanal Story

OF A JUNGLE FIGHTING

OSGOOD SHOVEL

"... it cleared the path into the jungles for the men. They also used it in the coral pits to dig out the coral for the roads, which was just as hard as cement and a darn hard job to dig. But the old boy did its job OK without a breakdown or trouble of any kind."

From fighting fronts come many tales of gallant deeds, and not infrequently we have reports of outstanding performance where the fighting man's equipment also plays an important role. One such story is told by a soldier on duty in the southwest Pacific area . . . the story of an Osgood Shovel.

Osgoods are dipping their buckets deep into this globe-girdling combat. Their ruggedness, power, speed and mobility (Osgood measured air control) are winning for them the title of "fighting man's friend." Why not investigate Osgood now for dependable post-Victory performance?

PREVENTIVE MAINTENANCE WILL KEEP ROLLING STOCK "IN ACTION."

WAR BONDS WILL SUPPLY THE EQUIPMENT TO KEEP THE "ACTION" IN OUR FAVOR!

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HERCULES *IRONEROLLERS*

6 to 12 Tons

Diesel or Gasoline

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DRAGLINES - CRANES

Crawler & Wheel Mounted

THE OSGOOD COMPANY, Marion, Ohio

Oklahoma Builds Road Without F-A

Acceptable Local Gravel Permits Economical Base Construction With Minimum Use of Available Equipment

AT the present time, when most construction is directed and financed as an integral part of the war effort, it is interesting to learn that the Oklahoma State Highway Commission is now constructing with its own funds 9 miles of gravel base with a blended rock-asphalt surface on the section of highway from Claremore east to the Mayes County line. Although the contract for this work was awarded to Richards & Mullinix of Oklahoma City in December, 1942, the start of the gravel-base construction was delayed until October, 1943, because the grading, awarded under a separate contract to another firm, had not been completed.

The contractor was fortunate in finding a gravel pit located approximately 3 miles from the west end of the project which furnished a product exactly meeting the specifications. In the very rare cases when it was necessary to add material from another source to the gravel obtained from this pit, it was done by spreading the crushed stone, in the required quantities, on the gravel course previously spread, and giving the entire course some additional mixing.

Gravel from this pit was loaded by a 1 1/4-cubic-yard Bucyrus-Erie shovel into Ford and Chevrolet trucks having a variety of steel and wooden bodies of 4-cubic-yard capacity. The number of trucks used varied with the length of haul and their availability but an average of 40 was employed on the 9-mile job, with a 3-mile dead haul. The average 9-hour daily production was 2,000 cubic yards.

It was the contractor's responsibility under the specifications to produce a compacted base with a minimum thickness of 8 inches constructed in four courses, each separately compacted. The gravel was dumped in piles so spaced as to provide the necessary material for a 2-inch compacted thickness. An allowance of 25 per cent for shrinkage and compaction was made in the distribution

of the loose gravel.

Preliminary mixing was done by two Caterpillar motor graders which spread the gravel uniformly over the area to be covered. Tandem John Deere disk harrows pulled by an Allis-Chalmers and a McCormick-Deering wheel tractor continued the mixing operations until all segregation had been remedied and the gravel course was homogeneous, after which the motor graders restored the surface to proper crown and grade.

One Ford and two Chevrolet trucks equipped with 1,000-gallon water tanks and job-built spray bars added water in varying amounts as directed by the Resident Engineer to meet the requirements for compaction. The average was 12 gallons per square yard for the 8-inch base. A 4-inch Rex Speed Prime pump powered by a Waukesha motor was set on the bank of a creek at the west end of the job to fill the tank trucks.

Two more wheel tractors of the same makes pulled two 10-wheel traffic rollers which had been constructed in the contractor's shop. At the time of our visit to the project, the rolling necessary had averaged 220 hours per mile of 39-foot-width surface.

Since it is not considered practical to place asphalt surfacing during the rainy winter season in Oklahoma, work was temporarily suspended when the gravel base was completed, and the top will be placed during the summer.

Quantities and Personnel

The major quantities involved in the contract were:

Compacted gravel base course, 8-inch	173,632 sq. yds.
Grading	4,712 cu. yds.
Rolling	2,366 hours
Sprinkling	8,682 M-gals.
Blended rock asphalt	7,778 tons
Asphalt for seal (RC-2)	27,290 gals.
Blotting sand	674 cu. yds.

The contract was awarded by the Oklahoma State Highway Commission to Richards & Mullinix of Oklahoma City on their bid of \$186,526.91 on December 22, 1942, and allowed 120 working days to complete the work. The Superintendent for the contractor is John Erts, and O. H. McLaughlin, Resident Engineer for the State.

Safety Engineering: Putting It to Work

A compact practical book of 189 pages under the title "Applied Safety Engineering" has been prepared by H. H. Berman, Safety Engineer, Consolidated Gas Electric Light & Power Co.,

of Baltimore, and H. W. McCrone, Field Engineer, Baltimore Safety Council, and published by McGraw-Hill Book Co., 330 W. 42nd St., New York City.

The book is written to get results and is not just theory. Four chapter heads best illustrate the approach of this worthwhile volume, "Getting Down to

Cases", "Get Facts", "Get Action", and "Get Interest". There is a chapter on how to write safety rules and regulations, with samples, and a discussion of a number of specific cases and how conferences on types of cases can be held.

This book is recommended for all construction organizations and costs \$2.00.

do the shovels you're using . . .

WEAR-BACK HERE? BREAK HERE?

TUBULAR SHAFT

THIS SHOVEL HAS A BACKBONE

17 GAUGE 13 GAUGE 17 GAUGE

(SOCKET)

(FROG)

All Formed of Thicker Steel

(CUTTING EDGE)

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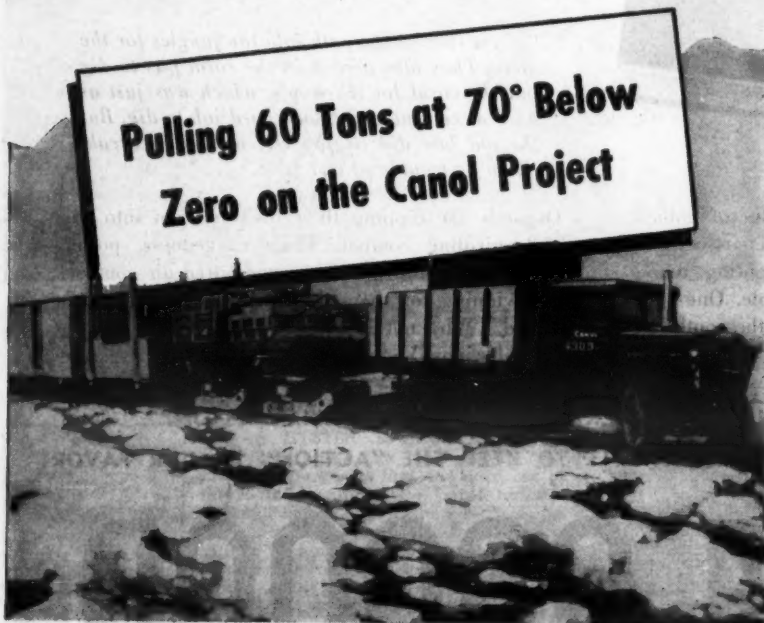
are 60% thicker at these points of wear and strain—taper to the sides. Give you 13 gauge strength and stiffness, only 15 gauge average weight.

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Blueprint, Not Just List, Post-War Projects Now

The following timely discussion appeared in a recent issue of *Nerba*, published by the New England Road Builders Association:

There is no doubt that "post-war" planning is one of the most popular home-front activities today. Everybody is planning or talking about planning. And one type that has caught public acceptance is the planning of post-war public works construction to provide useful jobs for returning military personnel and war workers who may be temporarily unemployed during the re-conversion of industry.

But how practical is this planning for post-war construction? And what will come of it?

Recent surveys indicate that several hundred cities in practically all of the states are engaged in some sort of public works planning. But a closer investigation reveals that most of this planning is confined to the listing of desirable improvements.

Examining the needs of a community and listing projects that should be built is, of course, the first step that must be taken in preparation for a public works construction program. But lists alone will never get these projects ready for construction. They must be planned, and planning means drawings and specifications, cost estimates, approval by public officials, and financing.

When the last depression struck, thousands of plans were dreamed up overnight—but it was many months and sometimes more than a year before these plans were put into workable form and made ready for construction. It is true that many communities now have lists of desirable public improvements, projects that would have been built before had not the war intervened. But should the war end suddenly in the near future, very few of these so-called plans could be used for starting actual construction.

The great value of planning a public works program now is that we still have time to do a thorough job of it, to select the most important of the improvements needed by every community, to decide which ones should be built first, and to draw plans for them that a contractor can translate into buildings, material and man-hours of labor.

There are several outstanding examples of states and communities actually getting their post-war construction plans in blueprint form. The state of New York has appropriated some \$3,400,000 for preparation of drawings and specifications for public works which can be let to contract at short notice at the end of the war. The City of New York has set aside \$25,000,000 for similar purposes. New York City plans to have over \$600,000,000 of essential public works projects ready to let to contract at the war's end. Syracuse, N.Y., is another city now engaged in the practical phase of this planning.

This practical planning can be done now without interfering with the war effort. Thousands of architects and engineers, who for the past two years have been busily engaged in designing war-time construction, are now being released with the passing of the peak of war construction. The majority of them are available to make studies, estimate costs, and prepare actual designs in every community. These professional designers now have more time to devote to this type of work than they will have later during the post-war period when private construction will again absorb them. To get the most use out of this group of highly trained planners, they should be put to work now turning lists of worthwhile projects into blueprints.

Funds for Post-War Plans

The Public Roads Administration of the Federal Works Agency has an appropriation of \$60,000,000 which can be used in cooperation with the states in highway planning. Since it is to be

matched on a 50-50 basis, a total of \$120,000,000 is potentially available, yet Federal Works Administrator Major-General Philip B. Fleming, speaking in

New York recently, reported that many states have not yet applied for any part of these Federal funds to which they are entitled.

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POWER MOWERS

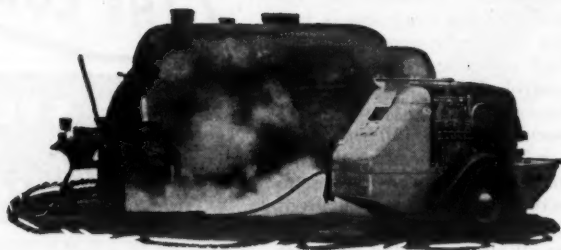
All Over the World

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"TANKAR" HEATER



The Littleford "Tankar" Heater is the fastest steam producing unit ever designed. It will develop steam in two minutes' time. "Tankar" Heater will heat tank cars in 1/3 less time than ordinary units.

This Littleford Unit can also be used to clean motors, engines, all types of Road Equipment, platforms, garage floors, walls, etc.

"Tankar" Heater is small, compact, completely automatic, easy to trail. For a modern fast tank car heating or equipment cleaning unit, be sure you use this Littleford "Tankar" Heater.



LITTLEFORD

Littleford Bros., Inc.
485 E. Pearl St.
Cincinnati, Ohio

Disposal of Surplus By Present Agencies

(Continued from page 47)

struction units were used for war and will be used again for peacetime work.

Who Will Dispose of What?

There are so many agencies that might have something to do with the disposal of surplus equipment that we are reporting here the functions of the various agencies of government for this purpose, now in existence and proposed, which were represented at the ARBA sessions.

The manner in which the Procurement Division of the U.S. Treasury Department became an agency of disposal of surplus equipment was described by E. I. King, of the Property Utilization Branch of that Division. Under Section 16 of an Act of March, 1933, the Executive Branch of the Federal government, by Executive Order 6166 dated June 10, 1933, created the Procurement Division which was a branch of supply or purchases of standard items used throughout the Executive Branch. As a function of this, it promulgates the Federal specifications for purchases and was given, in addition, the control of all excess supplies. These are rehabilitated by the District of Columbia office and the property distributed to other departments of the government. The various offices in the field are circularized and then those articles not wanted are certified for disposal. When the war came, Executive Order 9235 created the Property Utilization Branch which located government surpluses and liquidated them, including the WPA and NYA. Surpluses were delivered to the War and Navy Departments, other government departments, to tax-supported agencies of the states, and the balance sold to the public by sealed bids. The Procurement Division will not accept a bid for property unless it is fair, based on an appraisal, thus keeping to a minimum the possibility of sales being made to speculators. It is the endeavor of the Property Utilization Branch to dispose of all surplus stocks coming into its hands so as to cause the least disturbance to the economy of the nation. In support of this, Mr. King pointed out that all government agencies pay for the materials or equipment secured from the Procurement Division and that the

advice of producers and users of equipment of different kinds is sought to determine the best manner of disposal.

The Requisition Division, Foreign Economic Administration, was created by the Act of 1940, primarily as a requisition agency to prevent materials and equipment reaching enemy countries. The term "requisition" has the meaning of seizure in this use. The act requires the issuance of an export license to all exporters who send shipments of any kind to foreign countries and in this manner controls the possibility of certain critical commodities reaching the enemy. In 1942, this Division seized 22,000 carloads of stranded materials in the New York freight area and 15,000 carloads elsewhere. This was looked upon the same as surplus material today and had to be put into useful channels. Between 12,000 and 13,000 right-hand-drive trucks were found which it was expected could be disposed of to the highway departments but the Engineer Corps of the Army took them. Through these seizures the Division became a distributing agency and has since become active in securing materials for export to South America where there is a large demand for U.S. construction equipment.

Congressman Jesse P. Wolcott of Michigan, in speaking of the need for protection of manufacturers of construction and other equipment at a session of the Manufacturers' Division of the ARBA, stated that the Congress is preparing to set up a new agency for the disposal of all government war supplies under the control of Congress and to provide that there will be no dumping, sales through speculators, or other actions that might in any way injure the national economy. Speaking of interpretations that have been made by agencies of the government created by Congress, Congressman Wolcott pointed out that the continuance of OPA after June 30, 1944, is now the subject of discussion "on the hill". There is a group of congressmen who feel that the bill should be rewritten in words of one or two syllables so as to be perfectly clear and then end every paragraph with the words "and by God we mean it".

How Should Disposal Be Handled?

Hal G. Sours, Ohio Director of Highways, stated in a prepared paper at the panel discussion of the ARBA that surplus equipment should not be disposed of indiscriminately, whether it is given or sold to public agencies. If given, the

public agency should be made to show definite need for each item. If sold, there would be less chance of agencies' trying to get equipment which is not actually needed. This will prevent the public highway official who is charged with the responsibility of operating his depart-

ment so as to accomplish the maximum amount of work at the least cost from being tempted to take advantage of any offer of equipment that he can get for nothing or at greatly reduced cost.

Mr. Sours continued, "The equipment (Concluded on next page)

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THE COMPLETE LINE

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"TAILGATE LOADER"
CAPACITIES 750 LBS.
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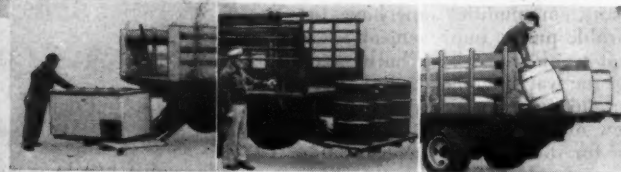
ONE MAN NOW DOES THE WORK OF THREE

Old Way—Requires 3 Men



QUICKLY-EASILY MOUNTED ON
TRUCKS NOW IN SERVICE
OR ON NEW TRUCKS

★ SOLVES MANPOWER SHORTAGE
★ CAN PAY FOR ITSELF IN 30 DAYS



One man slides heavy cooler onto lowered tailgate. One man operates lever to raise 3 heavy drums. One man easily handles barrels raised flush with floor

NEW WAY with TAILGATE LOADER

- ★ SAVES MANPOWER! One man now does what three or more formerly did.
- ★ CUTS LOADING AND UNLOADING TIME! Trucks are loaded and unloaded faster—keeps them on the move.
- ★ REDUCES PERSONNEL ACCIDENTS! Loads are lifted to body or lowered to ground by powerful hydraulic hoist mechanism controlled by one convenient lever.
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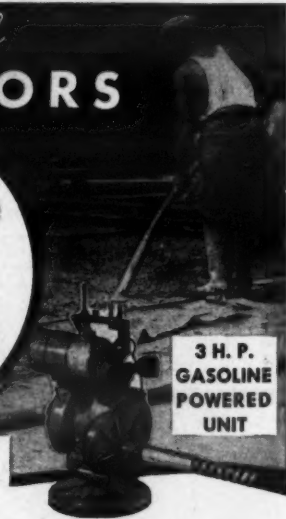
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PLACE
More Concrete
FASTER
with LESS
Labor



3 H. P.
GASOLINE
POWERED
UNIT

★ Immediate delivery on Gasoline Powered 1 1/2 H.P., and wheelbarrow or round base mounted 3 H.P. units on suitable priority.

★ GREATER CAPACITY—for their size MALL Portable Vibrators place more concrete than any other vibrator.

★ HIGH FREQUENCY VIBRATION (7000 per min.) makes for greater uniformity, in strength and density of concrete.

★ PLACE A STIFFER MIX—than can be puddled by hand, eliminating honeycombs and voids.

★ INCREASE BONDING STRENGTH—with reinforcement and between successive layers.

★ VARIABLE SPEED GASOLINE ENGINE—starts easily, uses very little fuel, and supplies abundant power for 8 other interchangeable tools.

MALL Vibrators are ruggedly constructed for long hard usage. Vibrating elements are made of the toughest materials with special metal, welded tips designed to withstand constant abrasive action.

Ask your Distributor or Write for full details.

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Plans for Disposal Of Surplus Equipment

(Continued from preceding page)

should not be turned over to organized speculators to be sold at what they can get for it. Either the manufacturers or regular dealers who can offer proper service afterwards should handle the equipment if it is to be sold. If there is no control of what any public agency can get, there might be a tendency to ask for many items not needed and which would, over a period of time, prove costly to own. The spare parts on aging and out-moded equipment create a problem. Too much machinery of certain types in the hands of a public agency creates a temptation to enter the field of construction in competition with private industry. I am unalterably opposed to this.

"I do not favor the return of any equipment from foreign fields. Most of it will have been used and in many cases used hard and under trying conditions. The cost of returning it plus the overhauling and upkeep would make it a costly venture. Much of the equipment now shipped to foreign countries could be used in the reconstruction of war-torn areas either by us, if we do any such reconstruction, or it might be sold to other countries for the same purpose. Someone will have to furnish equipment for reconstruction in foreign countries and American industry might as well attempt to cultivate this market. It might conceivably provide the needed impetus to road construction in some of those countries.

"Whatever the methods of disposal or use might be which are eventually set up," concluded Mr. Sours, "they should

be so regulated as to give the public agencies advantage of a fair plan while at the same time the results of such distribution would not cause serious economic disturbances."

A. E. O'Brien, Executive Secretary, Associated Pennsylvania Constructors, speaking for contractors, brought out the fact that if the disposal of surplus equipment is not done right it can bring ruin to the continuing post-war construction program by killing off the construction equipment manufacturing industry through inability to sell in a market which has been glutted with the promiscuous dumping of surplus government-owned equipment. He favors releasing no surplus equipment in this country but its shipment overseas for release there under lend-lease or other method for use with the equipment already there to aid in the rehabilitation of the war-devastated countries. Any new equipment remaining in the hands of the government in this country should be returned to the manufacturers for resale by them under a system that will not upset the stability of the industry.

G. W. Van Keppel, President, Associated Equipment Distributors, made a plea for the sale of all surplus equipment through established equipment distributors in order to maintain uniform prices which would bring a fair return to the taxpayers, to control the rate of distribution of the equipment so as not to disturb the market, eliminate speculators, distribute the surplus through established trade channels, and give small business a chance.

One manufacturer believes that a moratorium on the sale of all surplus equipment for at least two years after the close of all hostilities would be the best answer to the question of stability of the industry. All equipment would thus be warehoused, or stored in the open with some degree of protection, for that period, giving

the manufacturers of construction equipment a chance to get under way with their present staffs in the production of the best possible models to permit construction to proceed with the greatest speed to win the peace at home. Perhaps this manufacturer is not altogether altruistic for it can be pointed out that there would be little market for this equipment in a construction industry driving ahead full steam for two years with the newest equipment. Obsolescence and rust might dispose of much of the stored equipment in this time.

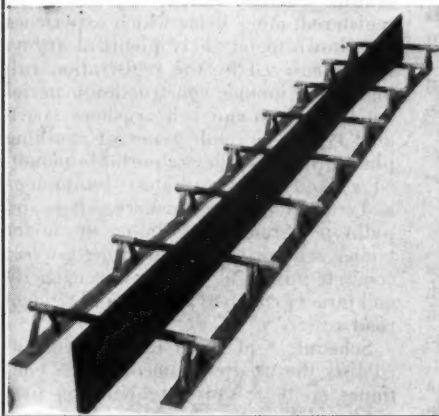
If we as a people have the ability to

produce and destroy so many million dollars' worth of munitions and construction equipment as a war measure, it might be a smart and economical method of establishing the country on a sound future program to turn every bit of used construction equipment in the hands of the government into scrap for the hungry peacetime steel furnaces and start out fresh with new equipment!

March has been designated as Red Cross Month, when the American Red Cross must raise its 1944 War Fund of \$200,000,000. Let's give!

For ease of assembly
and speed of installation
of expansion and contraction joints,

use **TRUS-ASSEMBLY**



It brings extra profits to the contractor by reducing installation costs to a minimum;

also saves the government money by eliminating maintenance expense caused by inaccurate alignment of dowels.

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PRODUCTS CO.**

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Twenty-two REASONS Why FLEX-PLANE Dummy Joints are Necessary in Modern Concrete Pavements

- Reduces the Number of Expansion Joints
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- Lessens Deterioration
- Lowest Cost



FLEX-PLANE joint installing machines eliminate messy hand methods. Install all types of joints . . . ribbon, poured, pre-moulded, etc., with or without VIBRATION.

• Ask for Equipment Specifications •

FLEXIBLE ROAD JOINT MACHINE CO. - WARREN, OHIO



Quite a few thousand dollars Would Pay for Quite a few **BUCKEYE SPREADERS**

In answer to a direct question on what his Buckeye Spreader had saved him over previous methods of spreading, one contractor wrote, "Quite a few thousand dollars." Other users made the comments listed at the right.

Accuracy is the keynote behind Buckeye Spreader success. A spirally fluted, transmission-driven, adjustable speed feed roll grips the material and distributes it positively through a measured gate opening. This insures a "metered" flow that spreads material within a variation from calculated volume of as little as 1% to 3% on many jobs. The Buckeye Spreader is far more than a truck tailgate attachment—it is a *Spreading machine* from the ground up. Complete data in 8 PAGE BULLETIN. Write for copy. BUCKEYE TRACTION DITCHER CO., Findlay, Ohio.

"Save 30 to 50% on materials."

"This is the best spreader I ever used."

"Saves \$32.00 per mile."

"Saves approx. \$25.00 per mile."

"Saves at least 20% on material."

"Accurate within 2%."

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BUCKEYE TRACTION DITCHER CO., Findlay, O.

SPREADERS
R-B FINEGRADERS
ROAD WIDENERS
TRACTOR EQUIPMENT
CONVERTIBLE SHOVELS
TRENCHERS

Wartime Maintenance On No. Dak. Highways

(Continued from page 56)

tion, hauling, spreading and compaction, but during the period of defense construction contractors were unwilling to bid on work of this kind at a satisfactory price and the department has been obliged to do the work with its own forces.

Many of the available gravel pits contain no oversize material and can be used to produce acceptable pit-run materials. In other cases screening and crushing plants were rented to produce specification material. The gravel excavating and loading equipment owned by the Department includes: a 1/2-yard Austin Badger shovel, a 3/4-yard Bay City shovel, a 5/8-yard Koehring shovel; six Pioneer loaders; one conveyor made by the Highway Department; and seven tractor-drawn scrapers which deliver gravel to a trap from which a conveyor loads it to trucks.

Disastrous floods during the spring of 1943 put an additional load on the maintenance department, as many fills were completely destroyed and had to be replaced. Most of this work was also done by state forces and equipment.

Treatment for Frost Boils

The use of calcium chloride to lessen the damage from frost boils in North Dakota appears to be quite effective although it is considered too expensive to use in all locations. It is used, however, where repeated trouble has indicated a definite tendency toward the formation of boils.

In these areas, holes are drilled 4 to 5 feet into the underlying soil with a 4-inch soil auger. The holes are spaced on 15 to 20-foot centers in all directions over the affected area, the bottom foot is filled with calcium chloride, and the hole backfilled with earth. The work is done late in the autumn shortly before any frost action is likely to penetrate deeply and has proved most effective in alleviating this troublesome condition where other methods of treatment had failed.

Motor-Grader Demand High

The total 1944 requirements for motor graders are 30 per cent higher than 1943

production, chiefly because of increased non-military demand, according to a recent announcement. The total production in 1943 was 3,607 motor graders. Pending a determination of how many can be manufactured this year, all applications for purchase orders of motor graders for governmental and other civilian uses are being denied for the present, except those in the first quarter already processed.

Steel and other controlled materials are available, but lack of components is retarding production. Rubber tires, transmissions, universal joints, and gears are particularly short.

WPB Revises Ruling On Used Equipment

The War Production Board has announced a further revision in its regulation (Order L-196) concerning registration of used construction equipment. While heavy machinery, such as shovels, cranes, draglines, motor graders and crawler tractors, is still required to be registered, other items which experience has shown to be fairly plentiful are no longer covered by the registration ruling. These include construction-material batchers; jaw and roll crushers (portable type); portable types of crushing plants; blade ditchers; portable mounted rock-drilling machines; bituminous and concrete paving finishers; blade and pull-type graders; agitator or mixer bodies, with or without elevating towers; concrete mixers of 7-cubic foot capacity and larger; concrete pavers; and tandem road rollers.

Schedule A of Order L-196 as amended lists the used equipment which continues on the required-registration list:

Shovels, cranes, draglines, backhoes: power; crawler mounted; rubber-tire mounted, or walking (manufactured after January 1, 1930).

Motor graders: Self-propelled, earth-moving, rubber-tire mounted, 16,000 pounds and heavier, tandem and four-wheel-drive types.

Tractors: Crawler or track-laying type, all gages, bare and including tractor-mounted equipment such as bulldozers, angledozers, cranes, loaders, power control units, etc.; (all diesel and semi-diesel-powered models and specified gasoline-powered models).

Effective dates: Registration of equipment bought before January 18, on or before February 17; registration

of equipment bought after January 17 must be made within seven days after purchase. Registration of change of status: within one week of change. Restrictions on sale: February 2, 1944.

Compulsory registration of used equipment was first devised as a means

of setting up an inventory so that idle equipment could be made available to those who needed it and were unable to obtain it because of wartime restrictions. It is now felt that this latest revision of Order L-196 will eliminate unnecessary paper work and yet continue to fulfill its original purpose.



WELLMAN WILLIAMS TYPE BUCKETS

Williams Buckets have been famous for their many fine mechanical details for nearly 40 years. Since 1931, Williams Buckets have been built by Wellman.

WELDED CONSTRUCTION, featured in Wellman custom-built buckets, which made them so predominant in heavy duty steel mill service, is now applied to all

Wellman-Williams Buckets FOR LONGER SERVICE WITH LESS MAINTENANCE COST

Built in Multiple Rope, Power Arm, and Power Wheel Types in 3/4 yd. to 16 1/2 yd. capacities.

SEND FOR FREE BULLETIN. Tell us about your particular requirement and we will send full description of construction and features in special bulletins which clearly prove why YOUR NEXT BUCKET SHOULD BE A WELLMAN.

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SPECIFY KRON SPRINGLESS DIAL SCALES

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BATCHER PLANTS for.

ACCURACY—SPEED—DEPENDABILITY

THE KRON CO.

Bridgeport, Conn.



Construction Experience Has Proved Reinforced Pavements Permanent and Low in Maintenance Cost. When Using Available Reinforcing Steel Specify Laclede's Complete Line of Proved Pavement Reinforcement.

- Welded Wire Mesh
- Reinforcing Bars
- Billet Steel
- Rail Steel
- Steel Center Joint
- Recess Joint
- Expansion Joints
- Construction Joints



WRITE FOR CATALOG

- Welded Dowel Spacers
- Welded Bridge Floor Trusses
- Pavement Accessories
- Bridge Accessories
- Steel Pipe
- Wire
- Welded Straps

LACLEDE STEEL COMPANY

GENERAL OFFICES

ARCADE BUILDING

ST. LOUIS, MISSOURI

Runways and Roads Are Kept Free of Ice

(Continued from page 65)

snow clings to the pavement surface.

An 86-foot width of the runway is cleared for the safe landing and departure of planes. The spreader treats a strip 43 feet wide, thus covering the runway in two trips. Snow is leveled at both sides on the remaining width of the runway, and piled snow is eventually pushed to the edges of the field by means of power graders, so that it cannot endanger operations.

The service roadways linking shops, hangars, storage points, and administration units receive the same treatment as the runway area. Plows mounted on the versatile jeep keep walks and narrow avenues in the troop area accessible at all times, carving out passageways through formidable drifts with little effort. Concrete aprons where the planes are serviced out-of-doors also receive the attention of snow-removal crews so that routine operations will not be delayed after the storm has passed.

Last winter, ice 12 to 18 inches thick formed on the apron around a group of parked planes, because the arrangement and spacing of the aircraft made the spot inaccessible to equipment. This accumulation of several storms was quickly removed by two applications of straight salt, when orders called for the transfer of the planes. After the first sprinkling, the caked ice was pitted by the dissolving brine formed by each crystal to a depth of 4 to 6 inches. A second liberal spreading dislodged the mass from the pavement and made it relatively easy to remove the broken-up chunks without hours of tedious work.

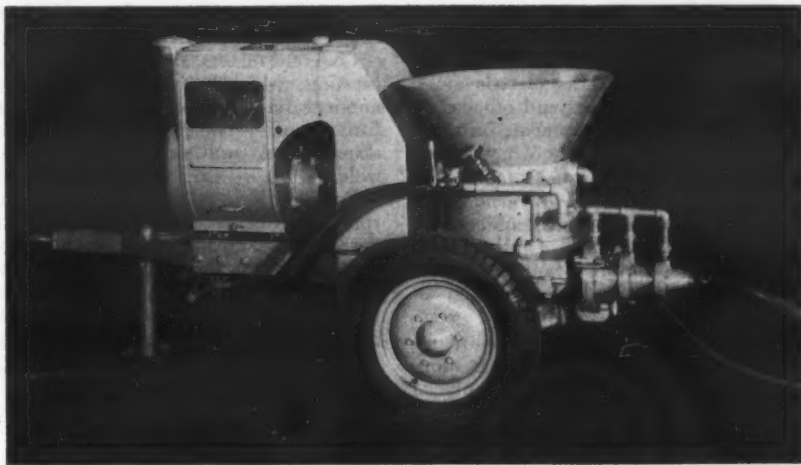
Unless the storm is severe, a single application of salt gives adequate anti-freeze protection. The savings on use of equipment, tires, gasoline, and plow blades are reported to be considerable when this treatment is used at the beginning of a storm. Fewer trips are necessary, the progress of the plow is reported to be faster because no frozen spots are encountered and, most important of all, it is possible to maintain safe bare pavement.

The vast program of constructing new airfields for the Army and Navy involved the use of many road-building methods and machines; now the practice of state and county highway engineers for a modern method of ice prevention has been adopted for the winter maintenance of these airfields.

New Concrete Gun For Post-War Jobs

Pneumatically placed concrete, shot or sprayed into place by compressed air, is used in tunnel, water and sewer-pipe construction, for reservoirs and irrigation ditches, coating earth dams and spillways for flood and erosion control, and in a wide variety of maintenance work to repair and re-seal deteriorated structures.

Among the new equipment which will be available for post-war construction and rehabilitation jobs is the recently



The new CMC concrete gun.

announced CMC concrete gun for the pneumatic application of concrete. The new machine is built in one size, but with two variable speeds. In low speed a 1 1/4-inch inside-diameter material line

is used, and 105 cubic feet of free air per minute at 60-pounds pressure is required. Capacities in low speed can be varied from 1 to 2 1/2 cubic yards an hour by means of the engine throttle.

In high speed, a 1 1/2-inch inside-diameter material line is used, with 210 cubic feet of free air at 60-pounds pressure. Capacities in high speed can be varied from 2 to 5 cubic yards an hour.

The model illustrated is equipped with an engine to drive the gun mechanism, but requires a 105-cubic foot compressor. The post-war model of this concrete gun will have a 3-cylinder W-type 105-foot liquid-cooled single-stage compressor, with engine, and the gun will be driven from an extended shaft and gear reduction from the rear end of the compressor through a clutch. This will save the necessity of towing two pieces of equipment to or about the job, and also will provide compressed air for other pneumatic tools, as the air can be cut off from the concrete gun, the gun clutch disengaged, and the compressor used alone.

Copies of the 8-page Post-War Special Bulletin, No. 9944, announcing this new CMC concrete gun may be secured direct from the Construction Machinery Co., Waterloo, Iowa.

FOR Heavy Duty REPAIR
RODGERS UNIVERSAL PRESS

AND TRACK SERVICING EQUIPMENT is on the job with contractors and engineers everywhere, who have important construction contracts to complete on schedule. With precious time and expense an important factor in our all-out effort for a speedy victory, these men know the equipment that is best on general overhaul work. ★ Rodgers Universal Hydraulic Presses can be used in any place and in any position where pulling, pressing or lifting power is needed. Rodgers Universal Press is portable and can

be carried to the job and assembled around the work, where the frame can be used in any position convenient for the operator. An important feature is the 4-speed pump, weighing only 73 pounds. On low speed one man can produce more than 100 tons pressure with press illustrated above. ★ Contractors and engineers throughout the country heartily recommend Rodgers Universal Hydraulic Presses with Track Servicing attachment as essential to their equipment. ★ Rodgers Hydraulic Inc., St. Louis Park, Minneapolis 16, Minn.

Manufacturers of

UNIVERSAL HYDRAULIC PRESSES • HYDRAULIC KEEL BENDERS • HYDRAULIC PLASTIC PRESSES • POWER TRACK WRENCHES
TRACK PRESS EQUIPMENT • HYDROSTATIC TEST UNITS • PORTABLE STRAIGHTENER FOR PIPE AND KELLYS

VULCAN TOOLS

A complete line for every type of Rock Drill, Pavement Breaker and Clay Digger.

Vulcan Tool Manufacturing Co.

35-43 Liberty Street, Quincy 7, Mass.

Branch Offices and Warehouse Stock:

74 Murray St. 34 No. Clinton St.

New York 7, N. Y. Chicago 6, Ill.

Rodgers HYDRAULIC Inc.

Navy Shops Overhaul Variety of Equipment

(Continued from page 27)

finished work is lightly buffed. Worn track rails are carefully built up as nearly as possible to their original height and size with high carbon rod. The rod is run in stringer beads and each bead is hammered so as to obtain a smooth and durable surface. The rails are also lightly buffed. Worn connecting-pin holes are built up for future cutting to correct size. Track rollers are built up in a six-leg metal jig to approximately a true circle of the designed radius and transported to the machine shop where, in a shop-built device resulting from the addition of a grinding wheel powered by a General Electric motor to a shop-built lathe powered by a Delco electric motor, they are refaced to exact size.

Worn shafts which have been previously checked and are still considered serviceable have Lincoln Fleetweld No. 7 or Airco No. 87 welded on before they go to the finishing shop for final machining.

Engine Overhaul

In the engine section of the heavy-equipment shop, diesel and gasoline engines are disassembled, each component part inspected, checked, repaired if advisable, or replaced if necessary. Cylinder sleeves, pistons, rings, valves and valve seats are given individual attention.

Among the equipment for this purpose is a piston grinding machine which can handle from 2 to 6-inch pistons and which can also convert wet sleeves into dry ones. For use in equipment destined for continental use, pistons and rings are refinished to over or undersize but equipment for advance-base use has only standard factory-sized parts installed. A valve machine is capable of handling valves from $\frac{1}{4}$ x $\frac{3}{4}$ -inch stem to $\frac{3}{4}$ x 5-inch head and can also replace or install valve seats in block and cylinder heads. Pin bushings can be made and fitted, blocks can be bored and sleeves installed, bearings re-run and line-reamed, inserts babbitted and line-reamed, cracked block heads and manifolds repaired by the cold wet method.

There is an electrical department to take care of all such equipment. Here all magnetos, distributors, generators, and starters, as well as electric saws, grinders, drills, welders and other electrically operated equipment, are re-conditioned.

A carburetor department takes care of all types and sizes of carburetors, which are cleaned, disassembled and checked. New parts are installed when needed. Fuel pumps, both electrical and mechanical, are also serviced in this department.

After thorough checking, repair, or replacement, the parts are once more assembled into a unit which is placed on a motor run-in stand, built of scrap material, and run for a test period of at least eight hours. If erratic behavior which cannot be corrected by minor adjustments develops, the entire engine is once more torn down and the trouble located. No piece of equipment leaves the shop until everything humanly possible has been done to assure that it will give reliable performance when placed in service at some distant overseas base where uninterrupted service is essential.

Other Service Shops

In the light-engine repair shop small engines receive similar attention. Cylinders are rebored, valves ground, faced and resealed, and electrical equipment is checked and completely rebuilt if it is considered necessary. Power saws, air tools and compressors are rehabilitated. A small detached room houses the office-machine repair department where typewriters, adding machines, and calculators are cleaned, adjusted, and necessary repairs are made.

In one corner of this building is a spring furnace, approximately 6 x 10 feet in size, constructed of fire brick and heated by natural gas mixed with air from the shop air lines. Tempering tanks for both oil and water are provided in various sizes and an expert mechanic assisted by helpers turns out single spring leaves or completed springs from the steel stock available.

The radiator repair shop checks the circulation in the cooling systems of all equipment received for attention. Radiators are checked, if necessary completely dismantled, and the individual veins cleared by the insertion of steel brushes. The complete radiator is cleaned and dents removed, air-tested for leakage, and when acceptable is re-

placed on the machine from which it came.

Concrete mixers are cleaned by sand blasting, which has proved both economical and successful. Special reinforcing of various parts of frames, skips, axles, and tongues is done by welding.

Portable light plants are checked for rpm and voltage output. Operated under specified load for several hours, none leaves the shop until performance is satisfactory.

The carpenter shop, manned by three

carpenters, three helpers, eight laborers, a saw filer and the foreman re-handle and re-sharpen picks, mattocks, hammers, saws and other small tools and construct packing cases in which these items, as well as electric hand saws, pneumatic tools, office machines and a variety of other small items, are packed and marked for shipment.

Brass Foundry

An interesting feature of the Depot is the brass foundry. Gradually de-

(Concluded on next page)



Seal Failure means Pump Failure!

The Impeller Shaft Seal is a vital part of a Centrifugal Pump because it preserves the vacuum. If the Seal leaks, the Pump fails!

The Novo Self-Priming Centrifugal Pump is engineered to eliminate seal trouble. The Novo Seal is completely surrounded by priming water at discharge head pressure. This distinctive water-bath cools the Seal and eliminates the possibility of lost vacuum. Novo's specially designed Impeller Shaft Seal never runs hot nor leaks air.

When you get your next Centrifugal Pump, get a Novo Self-Priming Centrifugal Pump with the Seal of Superiority!

For full information about Novo's complete line of Self-Priming Centrifugal Pumps (1 1/2" to 8"), send the attached coupon.

NOVO

ENGINE COMPANY

Also a member of A.E.D.



Engines

LANSING, MICHIGAN

-  Diaphragm and Pressure Pump
-  Generator Set
-  Hoists
-  Self Priming Pumps
-  Pavement Breakers

SHUNK

SCARIFIER SAW-TOOTH BLADES



Cut thru where others stall

Here is BIG profit for a small investment: Use these blades where you previously have had to use a scarifier.

Get the even distribution possible only with a blade, yet penetrate the hard surfaces.

Increase the usefulness of your motor graders, bulldozers, under-truck-maintainers, road drags, snow plows and other maintenance units. No extra parts are required. You simply replace the blade you are now using with a Shunk Saw-Tooth Blade.

Write for complete data on USES and PRICES.

THE SHUNK MFG. CO.

NOT INCORPORATED

Bucyrus, Ohio

Made in varying sizes, with angle and spacing of teeth according to the work to be done. Blades with two cutting edges—for DOUBLE DUTY—are available in any combination of saw-tooth or plain edges.

BIG JOBS AHEAD



for YOU...

with JACKSON VIBRATORY HAND SCREED!

But before you tackle the big Post-War concrete contracting jobs, get acquainted with the wide scope in concrete surfacing operations offered by the JACKSON SC-4A vibratory hand screed. Its advantages include lightweight, uniform vibration and adaptability to reasonable widths of section. Gives complete puddling to low-water content concrete. Write for further details.

ELECTRIC TAMPER & EQUIPMENT CO.

LUDINGTON MICHIGAN

☆

**Buy A Share
In America**

☆

Lend a
HELPING HAND
with your
WAR BONDS



Construction Units Restored to Service

(Continued from preceding page)

veloped experimentally and not yet fully equipped, it has nevertheless proved so profitable that it is to be enlarged and improved. It was early decided that it was impracticable to repair worn bushings, because of the waste incident to scrapping large quantities of this critical material. It was therefore deemed advisable to recast it.

The present furnace consists of a 500-pound-capacity melting pot which is heated over a hole dug in the ground and lined with fire brick. It is 2 feet in diameter and 2 feet deep and the heat is furnished by the burning of fuel oil vaporized and blown into the furnace by air from the compressed-air lines of the shop.

The melting pot, which is also used for pouring, is suspended by a roller-mounted 2-ton-capacity Yale chain hoist running on a 3/4-inch steel cable. Patterns are made in the nearby pattern shop, molds in an adjoining room, and the finished brass castings are taken to the machine shop for finishing.

Proving Ground

After machinery has been completely re-assembled and is presumed to be ready for service, it goes to the proving ground. An area of approximately 25 acres, including ridges and low muddy ground, is the scene of this operation. Hills are reduced to hollows, mountains of dirt grow in the low areas with tractors pushing and pulling dirt up steep grades. Trenches are excavated and refilled; crawler machines work in track-deep mud and in the hardest material available. "Bugs" in the shop repair work show up under this testing method as they would in the field and are corrected before the equipment is loaded for shipment.

Machines which have been proved ready for service go back to the wash racks and then to the paint shop where upholstering, body and metal work is also taken care of. The equipment in this shop includes Binks and DeVilbiss paint spray units. There the machines destined for service at advance bases are given a red-oxide prime coat and one coat of olive-drab lusterless paint, while machines for continental use are given a prime coat and one coat of battle-gray.

Salvage Operations

An important part of the Equipment Repair Depot is the scrap-metal salvage operation. The material is obtained from obsolete and worn-out equipment and parts too badly worn to warrant repair. All departments cooperate in the designation of metal for the scrap yard. A truck with a crew of three men is constantly engaged in transporting metal to the yard which is manned by nineteen workmen who use four Oxweld acetylene cutting torches operated with gas produced in one Miles, one Torch-weld and two Sight Feed generators and bottled oxygen. At this yard the metal is handled only once, being placed in Dempster-Dumpster boxes as sorted. These are picked up by a crane and

dumped into the railroad cars. By this method cars are loaded in an average time of 50 minutes and no railroad car for scrap shipment has remained on the track more than 24 hours. The cost of operating the yard had averaged \$3.21 per ton at the time of our visit to the project, while the average selling price of the scrap was \$16.81.

Personnel

The contract for the construction and operation of the Bureau of Yards and Docks Construction Equipment Repair Depot at McAlester, Okla., was awarded to the Dahlstrom Co. of Houston, Texas, for whom L. M. Bush is Superintendent and C. W. Estes, Master Mechanic. The average number of men employed is 500 and between August 1 and November 20, 1943, 855 cars of heavy equipment and 148 cars of small tools, parts, construction materials, and office machinery aggregating 16,062 tons had been wholly or partially processed at the Depot. Cost records indicate a wide variation in the expense of rebuilding

individual pieces of equipment since they are received in conditions which vary from only slightly worn to completely wrecked.

For the Navy Department, the operations are under the direction of Vice Admiral Ben Moreell, Chief of the Bureau of Yards and Docks. Lieut. Commander L. C. Parks, (CEC) USNR, with headquarters in Washington, D. C., is Officer-in-Charge of the Bureau's Construction Equipment Repair Depots at McAlester, Okla., Lonsdale, R. I., and Vernon, Calif. Lieut. Fred D. Booth, (CEC) USNR, is the Resident Officer-in-Charge at the McAlester Depot. His assistants are Lieut. (j.g.) Lynn H. Sumpter (CEC) USNR and Lieut. (j.g.) Bryan H. Carl (CEC) USNR.

Bethlehem Steel Appointment

B. O. Bach, Manager of Contracts, Fabricated Steel Construction, Bethlehem Steel Co., has been appointed Assistant General Manager of Sales. Mr. Bach began work in the Steelton Bridge

Shop in June, 1922, and was a foreman when he was transferred to the Order Department in Bethlehem. Since then he has served as Assistant to the Manager of the Fabricating Department, Manager of Orders, and in October, 1937, moved to the Sales Department and the position of Manager of Contracts, Fabricated Steel Construction.

Convenient Welding Chart

A chart to insure that the proper rod is chosen for each welding job has just been released by the Westinghouse Electric & Mfg. Co. The first column gives the application or purpose for the particular job in question, the adjoining columns give further essential data and the Westinghouse recommendation. The chart is mimeographed on two sheets of standard-size paper, convenient to tack up over the work-bench or insert in a loose-leaf binder.

Copies of the chart will be sent upon application to the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

LONG REACH SHOVELS

retain rated
capacity



with



WELDED DIPPERS

Long booms and dipper sticks make dipper weight a critical factor in engineering long reach shovels.

Less burdensome weight in PMCO Welded Dippers is a "life saver" for the engineer when the shovel's full rated capacity must be maintained.



1 YD.
Solid Cast Dipper
net weight 3280 lbs.

1 YD.
PMCO Welded Dipper
net weight 2280 lbs.

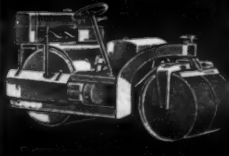
30% LESS WEIGHT on the end of a long dipper stick gives the shovel engineer a favorable factor to use in engineering long reach shovels.

**WE operate the largest and most complete
manganese steel foundry in the United States.**

**PETTIBONE
MULLIKEN
CORPORATION**
Established 1880
4700 West Division St.
Chicago 51, Illinois

C. H. & E. CONSTRUCTION EQUIPMENT

Free Ton Tandem
Relier
for patch work. Oper-
ates same as automo-
bile, slow forward and
reverse speed, con-
trolled by one hand.
Both front and rear
wheels can be filled
with water. Easy to
load on a truck for
transportation from
job to job.
Write for Bulletin,
10 N. Palmer St.,
Milwaukee, Wis.



C. H. & E. Manufacturing Co.
Milwaukee, Wis.

Division 3 Shops At Tuscaloosa, Ala.

(Continued from page 24)

good use of outside storage and work areas because of the advantageous weather, making outside work possible most of the year. There is a loading ramp for heavy parts and equipment, saving much time and labor. At the back, to supplement the 30,000-gallon concrete storage tank at the front, are two elevated steel asphalt storage tanks, one holding 6,000 gallons and the other holding 8,000 gallons.

A 9-stall truck storage shed protects the squad trucks used for transporting convicts to and from work on the highways. The Division has mounted a P & H-Hansen electric welder on a Ford truck, with a special frame and clamp for two cylinders for acetylene, welding in front of it and a box for the Smith

welding tips and hose. The clamp for the cylinders is a shaped piece of spring steel with a handle to turn the screw tight to prevent the cylinders from working loose. There is also a pick-up truck with another acetylene outfit.

For handling greasing in the field, an important service these days when every piece of equipment must be made to operate as efficiently as possible for longer than ever before, the shops have equipped two pick-up trucks with small Worthington shop compressors and Lincoln grease guns.

Salvage is another item of importance. This is handled in Division 3 by placing a Dempster-Dumpster bucket just outside the shop to receive all scrap. When it is nearly full and a truck is making a trip to the main shop for parts or supplies, the bucket is loaded onto the truck and the scrap delivered to the main scrap pile for sale.

Personnel

The Tuscaloosa Shops of Division 3 of the Alabama Highway Department

are operated under the direction of S. J. Cumming, Division Engineer, with John McKinley as Division Equipment Superintendent.

Lubrication Booklet By Standard of Indiana

A brochure dealing with the correct selection and application of petroleum products for grading and earth-moving equipment has been prepared by the Standard Oil Co. of Indiana. The foreword discusses the general lubrication problem, and from there the booklet continues with chapters devoted to tractors, tractor-mounted equipment, tractor-drawn equipment and other classifications of this type of machinery. Each piece is discussed in detail, its application for particular jobs, and the best way to lubricate it and keep it in good operating condition. Action photographs as well as detailed close-up photographs and diagrams of machine parts are included.

Distribution of the booklet will be

confined to the thirteen middle western states, but contractors and highway engineers in that territory may secure copies, already punched for loose-leaf binder use, by writing to the Standard Oil Co. of Indiana, 910 So. Michigan Ave., Chicago 5, Ill.

PUNCH-LOK Streamlined HOSE BANDING METHOD



SPEED-SAFETY-ECONOMY
In Clamping-Splicing-
Repairing-Mending-
Tieing-Reinforcing

PUNCH-LOK Streamlined Hose Banding Method is being used in hundreds of production and maintenance jobs in all industries for connecting high-pressure hose; splicing electric cable; stopping leaks in steam and water lines; reinforcing and mending splits in cross-arms and ladder rails; tying rigid conduit or flexible cable to existing pipe lines or girders; tying ends of wire or manila rope to prevent fraying—and many other jobs. PUNCH-LOK is giving wartime industries a fast, safe, economical, quality banding method. Investigate NOW the many advantages it will have for you in your present and postwar work. Let PUNCH-LOK solve your clamping or banding problems!



CLAMPS... Made of flat, high tensile, galvanized steel, double wrapped. Available from 3/8" to 4" I.D. Any large size clamp can be pulled down and made into a smaller size.



LOCKING TOOL... Sturdily constructed to assure long life. Locks all size clamps with a tensional pull of 1,000 lbs. Hammer punches and breaks excess band flush at clip.



GROOVED FITTINGS... For water or steam lines. Permits application of high pressure clamping without damage to hose.

Write for Descriptive Catalog and Name of Local Distributor

**PUNCH-LOK
COMPANY**
Dept. 1, 321 N. Justine St.
Chicago 7, Illinois



Pledge Your Support
BUY WAR SAVINGS
BONDS AND STAMPS

Arrange Your CONCRETE PATCHING SCHEDULE for 24 Hour Repair Service

Pavement patching must not be permitted to delay vital wartime traffic with sign cluttered pavements and extensive detours. Old-fashioned patching methods and delayed repairing are inadequate to meet the wartime need for uninterrupted flow of materiel.

Twenty-four hours is plenty of time for concrete to acquire safe opening strength. This is true even at low temperatures when proper cold weather concreting practices are followed. Just take advantage of the property of calcium chloride to produce required opening strength in about half the usual time.

The gains in strength resulting from the use of calcium chloride are uniform in mixes with either standard portland, high-early-strength or air entraining cement. No matter which cement you use calcium chloride will cut in half the time required to provide good patches. And, with calcium chloride in the mix you also get "built-in curing" to produce higher strength at all ages.

Our technical bulletins and our booklet, "Early Strength Concrete" are available on request.

CALCIUM CHLORIDE ASSOCIATION
4145 Penobscot Building Detroit 26, Mich.

DON'T	SLOW	WAR	TRAFFIC
SPEED	PAVEMENT	PATCHING	WORK

Interregional Highway One-Sixth Within Cities

(Continued from page 67)

Conclusion

The 33,920 miles of the recommended interregional Highway System includes 1,123 miles within the municipal limits of cities of 10,000 or more population. This is approximately the mileage required to provide direct connection into and through all of these cities joined by the various routes. The mileage reported is measured along existing streets now serving the traffic in the capacity described, just as the reported mileage of rural section of the routes is measured along existing highways conforming closely to the recommended interregional routes in rural areas. A desirable improvement of the system will alter these mileages both within the larger cities and in rural areas, generally by reduction.

Included also in the proposed total mileage of the recommended system are 2,347 miles within the limits of cities of less than 10,000 population. This also is measured along existing streets now carrying the traffic stream intended to be served by the proposed interregional routes. In some cases, a desirable improvement of the system will doubtless follow locations selected outside of these cities, thus decreasing to some extent the total mileage within municipal limits, but possibly tending to increase slightly the total reported mileage.

The 33,920-mile system recommended does not include any allowance for alternate, circumferential or distributing routes required at the larger cities for the dual purpose of by-passing through traffic and of distributing and assembling other traffic to and from the various quarters of the city. Although generally a relatively small part of the total, through traffic when joined with the traffic originated in or destined to outlying sections of a city results in a movement so large as to require circumferential routes in addition to direct city-entering connections. Since the proper location and mileage of these circumferential routes can be determined only by detailed study of the needs and conditions of each city involved, the Committee has merely estimated that the aggregate extent of such desirable alter-

nate and auxiliary routes will not exceed 5,000 miles. If added to the more definitely determined mileage of primary routes, this estimated mileage, probably located partly within and partly without municipal limits, would increase the total extent of the recommended system to about 39,000 miles.

An important service of the Red Cross is to relieve our fighting men from worry over difficulties at home. A staff of trained workers is maintained to aid service men's families in trouble. This service can be continued, however, only with your help, so give to the 1944 Red Cross War Fund.

DRAGLINE PRODUCTION TIP NO. 1

DON'T LOAD THE BUCKET UNDER THE FAIRLEAD!



Loading under fairlead wastes time, lengthens haul to dumping point and puts extra strain on machine.



...To move more dirt per shift, load bucket in this short-haul area directly beneath end of boom!

A Page AUTOMATIC Dragline Bucket digs and fills within 1 or 2 bucket lengths . . . no need to drag it in close to get a full load. Size for size and weight for weight, a Page AUTOMATIC will OUT-DIG any other dragline bucket made!

PAGE
Automatic
DRAGLINE BUCKETS

PAGE ENGINEERING COMPANY, CHICAGO 38, ILLINOIS

PARSONS

QUICK SHIFT CONVEYOR

The arc type discharge conveyor on a Parsons Trencher shifts through the machine by power so that spoil may be deposited on either side of trench as desired by the operator. This shift may be made in less than fifteen (15) seconds so that an obstruction can be cleared while machine is digging—a most important feature when operating in close quarters. The shift is by worm and worm gear which automatically locks conveyor in any position.

The conveyor is permanently located for height and does not vary when boom is raised or lowered. Trucks may, therefore, be loaded at fixed position discharge height.

The spoil to be retained for backfill is piled on opposite side of trench by merely moving a lever to reverse the direction of belt. Investigate Parsons superiority before you buy.



When desired a conveyor extension may be added to facilitate loading higher trucks or keep spoil bank farther from trench.

THE PARSONS COMPANY
NEWTON, IOWA

TRENCHING EQUIPMENT



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Koehring Co.	51
Kron Company	74
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LaCrosse Trailer & Equip. Co.	11
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Macmillan Petroleum Corp.	22
Madsen Iron Works	11
Mall Tool Co.	72
Marion Steam Shovel Co.	52
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Martin Machine Co.	63
McCaffrey-Ruddock Tagline Corp.	50
McKiernan-Terry Corp.	46
Michigan Power Shovel Co.	32
Mondie Forge Co., Inc.	25
Murphy Diesel Co.	69
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Osgood Co.	69
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Raybestos Division of Raybestos-Manhattan, Inc.	9
Riddell Corp., W. A.	38
Rockford Drilling Machine Div., Borg-Warner Corp.	30
Rodgers Hydraulic, Inc.	75
Rogers Bros. Corp.	55
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Schenck Derrick Co.	8
Schramm, Inc.	53
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Servicised Products Corp.	37
Shunk Mfg. Co.	76
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Sterling Wheelharrow Co.	32
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Texas Co., The (lubricants)	61
The Shovel Co.	13
Timber Structures, Inc.	59
Toro Mfg. Co.	71
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Union Fork & Hoe Co.	70
Union Iron Works, Inc.	22
Universal Engineering Corp.	65
Universal Power Corp.	6
Vulcan Tool Mfg. Co.	75
Walter Motor Truck Co.	48
Ward LaFrance Truck Div., Great American Indus., Inc.	67
Warren-Knight Co.	19
Waukesha Motor Co.	66
Wellman Engineering Co., The	74
White Company, David	53
White Mfg. Co.	58
Williamette Hyster Co.	48
Wind Power Mfg. Co.	35

Contractors and Engineers Monthly

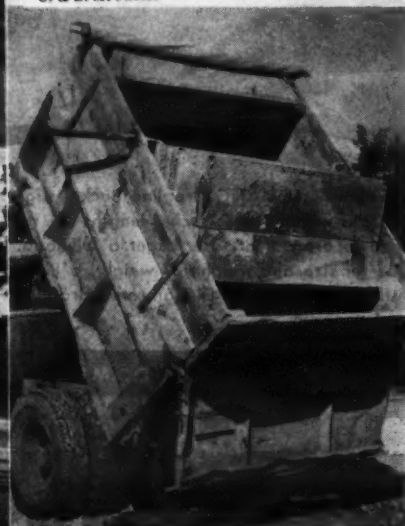


Speedy bridge construction by the Army Engineers. At left, the Hell-bult crane of a bridge-building unit lowers and places in position a pair of 15-foot 2,000-pound treadway onto a 33-foot pontoon saddle. This unit is locked to two others to form a 45-foot bridge section which is ferried across and fastened to the opposite bank. Below, the Engineers work back from the opposite bank to keep the near bank clear for the assembly of new sections as they are unloaded. See page 6.



Scenes on the Ivy H. Smith concrete paving job at Mt. Dora, Fla. Left, the bucket of the new Rex 34-E paver delivered a batch every half minute. Below, the automatic dumping of the bulk-cement batch boxes in the trucks was a feature of this job. Lower left, a pair of carefully built frames set on the green concrete defined the 4-foot center stripe to which black oxide was applied. See page 21.

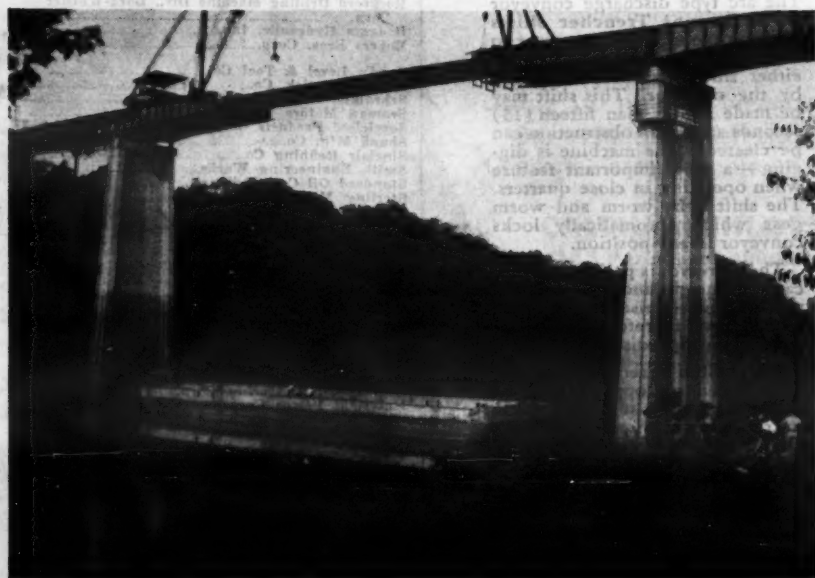
C. & E. M. Photos



Official U. S. Navy Photo

A timber truss raised to position by gin poles and hand hoists during the construction of a service building at the Naval Air Station, Pensacola, Fla. See page 68.

Below, raising the first of the 105-foot plate girders for the central section of the river span of the 1,330-foot concrete and steel-girder Foster's Ferry Bridge carrying U. S. 11 across the Warrior River south of Tuscaloosa, Ala. See page 46.



Sketch of a section of the Interregional Highway System traversing residential areas of a city. Built within a block-wide right-of-way, on a gently rolling grade, depressed pass under bridges at important cross streets and rising to normal ground level between with a varied median-strip width and with border areas suitable for neighborhood recreational purposes, this highway conforms in all respects to the standards proposed by the National Interregional Highway Committee. See page 2.

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